

[July

# THE AMERICAN JOURNAL of PSYCHIATRY

VOLUME 104  
NUMBER 2  
AUG. 1947

Official Organ of  
**THE AMERICAN  
PSYCHIATRIC  
ASSOCIATION**

lob  
ves  
the  
rec  
has  
me  
res  
ma  
thi  
seq  
tha  
thr  
is  
the  
chi  
fol

wh  
stu  
Dr  
hos  
cifi  
Th  
the  
tim  
pos  
ope  
era  
the  
199  
fro  
bet  
pat  
to  
of  
wh  
pat  
by  
ton  
ma  
nos

1  
can  
30,  
F  
ingt  
D.

# THE AMERICAN JOURNAL OF PSYCHIATRY

## CLINICAL AND EEG INVESTIGATION OF PREFRONTAL LOBOTOMY PATIENTS<sup>1</sup>

HAROLD STEVENS, PH.D., M.D., AND ABRAHAM MOSOVICH, M.D.

Washington, D. C.

The increasing employment of prefrontal lobotomy in mental disease has afforded investigators a unique opportunity to explore the physiology of the frontal region and in recent years an imposing collection of data has accumulated. However, the development of psycho-surgery imposes an unusual responsibility on the psychiatrist who must make the grave decision of recommending this drastic and irreparable procedure. Consequently it is a professional imperative that this exigent problem be investigated through every possible approach. This study is an attempt to illuminate one segment of the prefrontal lobotomy problem—the psychiatric and electroencephalographic changes following operation.

Thirty prefrontal lobotomy patients on whom adequate data were available were studied, all of whom were operated on by Drs. W. Freeman and J. Watts, and were hospitalized at St. Elizabeths Hospital. Specifically excluded from this series were: (1) The patients operated on prior to 1938, since the surgical technique was altered at that time; (2) patients with less than 6 months post-operative follow-up period; (3) two operative deaths. Seven patients were operated on before admission here and most of the patients were lobotomized between April 1943 and June 1944. Their ages ranged from 21 to 71, and over half the cases were between 30 and 50 years of age. Only 9 patients had received shock treatment prior to operation and only 3 had a formal course of psychotherapy. Aside from the 7 patients who were operated on prior to admission all patients were selected for psycho-surgery by members of the hospital staff, the symptomatology of each patient being the primary consideration rather than the diagnostic category (see Table I). In general

most patients received the operation because: (1) They were destructive, homicidal, or suicidal—a serious threat to themselves and others; (2) They had been sick for several years and the prognosis was poor; (3) They had shown no improvement or had regressed; (4) They had not responded to other treat-

TABLE I

### DIAGNOSIS OF 23 PATIENTS LOBOTOMIZED AFTER ADMISSION TO SAINT ELIZABETHS HOSPITAL

Dementia praecox	
Catatonic .....	3
Hebephrenic .....	2
Paranoid .....	2
Mixed .....	1
Undifferentiated .....	1
Manic-depressive	
Depressed .....	2
Manic .....	1
Mixed .....	1
Circular .....	1
Involutional melancholia .....	3
Psychosis with organic brain disease.....	1
Psychosis with cerebral arteriosclerosis.....	1
Undiagnosed psychosis .....	2
Psychoneurosis	
Obsessive, compulsive .....	1
Mixed .....	1

ment or were considered poor candidates for other therapy.

One patient (C. S.), psychotic for 8 years, developed active and progressive pulmonary tuberculosis with a positive sputum. He was extremely paranoid, aggressive, hyperactive, and pugnacious, constituting a serious ward problem because of his unrestrained spitting, severe weight loss, resistiveness to therapeutic attempts, and his refusal to eat or rest. Following the operation, although he was seclusive, preoccupied, and mute, he played chess, was tractable, ate and slept regularly, was responsive to the ward personnel, gained 37 pounds in 5 months, and his tuberculosis was arrested.

Another patient (W. P.) received a lobotomy because of severe lancinating pain due to tabetic crises that had plagued him for 10 years, effecting his complete demoralization with the result that he became addicted to morphine, was agitated and suicidal. For several weeks following the operation he suffered unpleasant dysesthesias in the same areas that were previously affected but these responded to aspirin and phenacetin, and after a few additional weeks, this medication was no longer

<sup>1</sup> Read at the 102nd annual meeting of The American Psychiatric Association, Chicago, Ill., May 27-30, 1946.

From St. Elizabeths Hospital and George Washington University School of Medicine, Washington, D. C.

necessary. At present he is composed, suffers no pain, goes home for visits with his family, and, although he still has mild paresthesias, he states that they are scarcely noticeable and are of no moment to him.

Freeman and Watts(1) believe that this relief of intractable pain following lobotomy is due to interruption of the thalamo-frontal fibers. This effect was also noted in another patient in our series who was coincidentally relieved of tic douloureux following prefrontal lobotomy for her psychosis.

Fig. 1 shows the estimated duration of illness and hospitalization prior to operation, the average being 10.1 years for the former

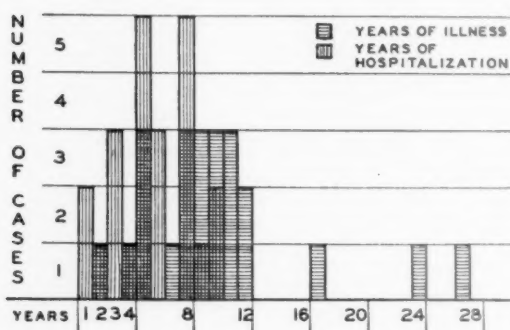


FIG. 1.

and 5.5 years for the latter, with standard deviations of 5.73 and 2.70 respectively.

**Postoperative Behavior.**—In the immediate post-operative period, these patients showed the various clinical phenomena described in detail by Freeman and Watts(1) including stupor, confusion, memory impairment, incontinence, and a tendency to perform rhythmic repetitive acts. Several months later their behavior showed a wider range of variation than would be expected from reviewing the literature on the subject, and the post-operative personality was often completely unlike the preoperative. For example, E. F., a depressed, agitated white woman with profound feelings of guilt and sinfulness, with strong suicidal drives, has become a boisterous, overactive, facetious, untidy extravert, completely uninhibited and oblivious to the sensitivities of her fellow patients. Conversely E. D., an impulsive, hyperactive, threatening manic, who regularly castigated the personnel with sulphurous invective, has become a retarded, docile, childish patient, who lives unobtrusively on a convalescent ward, quietly knitting and assisting with light tasks when requested.

In general, the results of this study confirm the impression that a better operative result can be predicted if the patient displays conspicuous affect, especially depression. The outlook is further improved if the patient has good intellectual and emotional resources. However, the operation often effects a drastic alteration in the personality and it is difficult to predict which facets of the personality will be changed. The technique of operation may influence this variable. Some patients are rendered obtunded in affect and intellectual function, are idle, subdued, lacking in initiative, and constricted in interests. Others are boisterous, windy extraverts, uninhibited, euphoric, and hyperactive. Almost all show loss of creative thinking and impairment of social consciousness. They are unable to plan or solve problems of any degree of complexity. There is a tendency toward indifference for the events of the future, and perseverance in even concrete tasks is limited. It is possible that some of these defects represent the irremedial consequences of a prolonged psychosis.

In about half of these cases there is decreased emotional play on their features; in a few, definite immobility of the facies, and the gamut of emotional expression, if not true affect itself, is narrowed. In 3 patients, the death of a loved one produced no evidence of grief and none of these patients has been observed to cry. On the other hand, one-third show overt behavior that suggests an inappropriate cheerfulness, a tendency to facetiousness, a low threshold to laughter, a kittenish playfulness and an insouciant disregard for the opinion and feelings of others. From observation of their overt reactions it is reasonable to infer that their affectual life has been significantly altered. However, it would be misleading to conclude that the patient's overt behavior necessarily reflects his true mood at all times. As in other mental states there may be considerable discrepancy between what the patient manifests and what he actually feels; for example, in the forced laughing and crying of pseudobulbar palsy and in the sham-rage of experimental animals. When the subjective state of the patient is investigated it is seen that the spectrum of emotional expression is narrowed and there is neither black despair nor transcendent ecstasy. The area of feeling has neither depth nor breadth and the ca-

capacity for a sustained mood is lost. It seems that the emotional tone of each engram is dissociated into weakly charged ideational units and complexes are thus dissolved. Consequently these patients are rendered less aggressive, more malleable, and better hospital or extra-mural citizens. In several who were desperately suicidal, the operation was truly a life-saving measure but a functional psychosis was traded for an organic syndrome.

As stated, the post-operative behavior patterns may differ profoundly from the pre-operative ones, and a lobotomized patient may resemble other lobotomized patients more than his own preoperative personality. It seems, however, that two general categories can encompass a large proportion of the post-operative behavior patterns:

1. The torpid, that is, those who show the previously described psychomotor and intellectual retardation, impoverished interests, reduced drive and "bleached affect."
2. The euphoric, that is, the silly, boisterous, uninhibited, overactive extravert.

Of course, many are mixtures of both and some show less socially reprehensible characteristics than others. No single trait was observed that completely characterizes the post-lobotomy patient, but the commonest feature is the tendency toward simplification of the reaction to the environment. For example, if the patient obtains a job it is usually much simpler, more stereotyped, less exacting, and on a lower intellectual plane than previously. If the housework is resumed, routine tasks are preferred, responsibility is avoided. The competitive events of life are not disconcerting to the patient and he is similarly insensitive to social censure. Observation of the mores is often reduced to a few simple principles that require a minimum of restraint and self-denial. The ethical code is simplified to a corresponding degree and childish lack of social conformity is common. This neglect of social values is often the principal reason for continued hospitalization after operation.

Psychopathic-like states are sometimes observed. Some post-operative patients show an ingratiating manner and excessive politeness alternating with childish petulance. There is also inability to persevere in a complicated task especially if it involves future returns or benefit. There is marked egocentricity, selfishness, indifference to the feel-

ings of others, distractibility, superficiality of affect and lack of self-control. None was guilty of any serious anti-social act or sexual delinquency. Several of the women reported diminished sex drive.

#### IMPROVEMENT FOLLOWING LOBOTOMY

Of the 23 patients lobotomized after admission to St. Elizabeths Hospital 21 benefited by the procedure. Eleven were considered social recoveries and of these 11, 9 were well enough to be discharged from the hospital. One patient was unimproved and one was made worse.

In interpreting the statistics of improvement of these 23 cases it is necessary to emphasize that this is not a random sample of patients with mental disease but represents chronically-ill hospitalized patients whose prognosis was considered poor, and whose violent behavior in about half the cases constituted a threat to themselves or to others.

In a series of 606 patients who survived this operation Ziegler(2) reported 85% benefited, and 68% much improved or recovered. Ziegler's data were accumulated from 19 different centers and include most of the psychiatric reaction types, with schizophrenic, involutional depression and obsessive neurotics predominating. Eight of these 606 patients were made worse, while other workers including Kindwall and Cleveland (3) and Hofstatter(4) emphasized that none in their individual series was made worse.

In January 1946 Freeman and Watts(5) reported a follow-up study on 331 cases, stating that about half of their patients were usefully occupied, one-quarter remained at home and one-quarter were dead or institutionalized.

The degree of improvement is variously estimated by different investigators and numerous factors must be considered in appraising these post-lobotomy changes; for example, the patient's social and economic opportunity, and his intellectual and emotional resources. The lapse of time after operation is also important and our series confirms Freeman's and Watts'(5) impression that some patients may continue to improve for as long as 3 years after the operation.

However, improvement is relative, and although a lobotomized patient is benefited by

the operation, and is a less difficult nursing problem, he still may be a "back ward" resident.

The post-lobotomy behavior level also depends upon the complexity of the patient's milieu and the amount of motivation offered him. A patient may remain inert and placid if left unstimulated by any challenge in his environment and, conversely, if presented with an insuperable or uninviting task, he may not be able to rise to the demand and will make no effort to attack or solve the problem, but lapses instead into mental and physical immobility. After operation, work suitable to the patient's changing resources must be given. Therapy does not begin and end with the lobotomy.

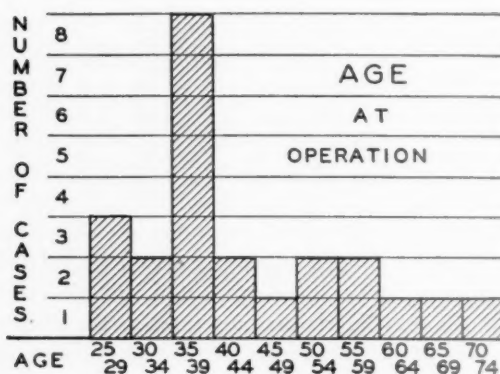


FIG. 2.

The age at operation (Fig. 2) shows no correlation with degree of improvement, nor does duration of illness and hospitalization (Fig. 1). In our series a prolonged illness did not militate against improvement. This is not necessarily in conflict with the observations of Freeman and Watts, that the earlier the operation is done, the better the results, since all our cases suffered prolonged illnesses and no comparisons were possible with patients lobotomized early in the course of their psychosis. Of course, the shorter the duration of the mental disease, the greater the likelihood of a spontaneous remission.

The 7 patients who had had lobotomies prior to admission are not included in the above statistics, since they represent the failures of an undetermined number of lobotomies and thus proper weight cannot be given them.

#### INTELLECTUAL CHANGES

In the intellectual sphere some authors have failed to find any loss of intelligence (6, 7, 8). In our series 9 patients were given the revised Stanford Binet test before and after operation but complete scatter was observed—3 showed an increase in mental age, 3 no significant change and 3 a decrease. The rest of the patients could not be tested pre-operatively because of their uncooperativeness or inaccessibility. Porteus (9) feels that the maze test is a more satisfactory measure of the patient's performance.

The inference that "intelligence" is unaffected by lobotomy is invalidated by the unreliability of "intelligence" tests applied to profoundly psychotic patients; therefore the increase in mental age observed in 3 of our patients does not mean that "intelligence" is improved by sectioning the frontal lobe but indicates that the patient is able to give a better performance on a specialized task because some obstructing ideational block has been removed.

The scores of the 4 tested patients who had post-operative convulsive seizures showed 1 higher, 1 unchanged, and 2 lower.

#### POST-OPERATIVE SEIZURES

In our total of 30 patients, 10 had post-operative seizures (Table II); 3 of these are seizure-free at present without any anti-convulsive therapy. The remainder have 2 or more attacks per year while on medication. Only one of the 10 has petit mal. This unusually high incidence of post-lobotomy seizures is at variance with the observation of other workers. Most investigators report from 0 to 10% of seizures following prefrontal lobotomy: for example, Freeman and Watts (5) report 10%; Bennett, Keegan and Wilbur (10) also report 10%; Kindwall and Cleveland (3) noted 1 in their series of 15; Ziegler (11) 1 in 17 surviving patients and Hofstatter (4) 1 in 45.

A satisfactory cause for this high rate of post-operative epilepsy in our series has not been found, but several possible factors can be mentioned: (1) these patients being institutionalized may be under closer scrutiny than patients in other series; (2) later follow-up reports may show an increased number of seizures. [As noted in Table II

the attacks appeared from 3 to 25 months post-operatively.] (3) lipoidal, which is used to identify the area of section, remains *in situ* indefinitely and may produce sufficient local irritation to act as an epileptogenic factor; (4) dying cortical cells may effect an epileptic discharge; (5) 6 of the 10 convulsive patients had received shock therapy prior to operation, in contrast to only 3 in the remaining 20 patients who were seizure free. This suggests that the shock treatment may have lowered the threshold of convulsions, which was then exceeded following the

able that this more radical posterior section of the thalamo-frontal tract, with its increased propinquity to the motor area, would be more likely to produce seizures. Meyer and Beck(12), however, in their report on the autopsies of 9 lobotomized patients, state that the one patient who had post-operative epilepsy and died in status epilepticus had the surgical lesion farther away from the motor cortex than in any of the autopsied cases, and the prefrontal cortex was not more damaged than usual. These authors further state "so far, we have not found any ana-

TABLE II

DATA ON TEN PATIENTS WITH POST-OPERATIVE CONVULSIONS

	Age at operation	Onset of convulsions months post-operatively	Frequency of convulsions	Diagnosis	Result of lobotomy	Treatment prior to operation
F. D. ....	38	25	6 per year	D. P. catatonic	Improved	Metrazol
E. D. ....	43	3	None in several years	Psychoneurosis	Improved	
E. Du ....	37	11	52 per year	M. D. circ.	Improved	Insulin Electric shock (2 x) Metrazol Insulin Psychotherapy and electric shock
M. H. ....	36	6	3 per year	D. P. paranoid	Unimproved	
A. K. ....	54	9	3 per year	M. D. dep.	Soc. rec.	
M. J. ....	35	19	Only 1 recorded	M. D. mixed	Soc. rec.	
M. N. ....	36	15	6 per year	D. P. catatonic	Unimproved	
M. O. ....	21	15	8 per year	D. P. hebephrenic	Improved	
P. L. ....	53	4	2 per year	Psychoneurosis	Worse	
S. I. ....	45	18	1	Involutional melancholia	Unimproved	

further cerebral trauma due to the lobotomy. Thus four times as many of the convulsive patients had received shock prior to operation but there are not enough cases to establish a reliable difference between this group and the non-convulsive group. Furthermore, the electroencephalographic findings do not indicate a significant difference in the shock and non-shock patients after lobotomy.

It is reasonable to expect that the more violent the patients the more likely they are to receive shock treatment, and by the same token, in those cases in which shock therapy is ineffective, there is greater likelihood that the more posterior transection of the frontal lobes will be used. For example, Freeman and Watts(5) state that a severe obsessive-compulsive neurosis of long duration may require incisions from 5 to 7 millimeters posterior to the conventional site of section and long-standing schizophrenia "requires the maximum operation." It seems reason-

tomical changes that would account for the epileptic convulsion."

Three of the convulsive patients in our series showed no psychiatric improvement after the operation and one was worse. This suggests a poorer result in the group of 10 convulsives than in the 20 nonconvulsive patients. However, further investigation of larger numbers is necessary before valid inferences can be drawn. It can be definitely stated, however, that periodic convulsions do not have a beneficial effect by inadvertently giving the patient a "maintenance dose" of convulsive therapy.

A complete neurological examination of all 30 patients failed to reveal any neurological effect of the lobotomy, and none showed the post-operative vasomotor phenomena reported by Ziegler(11).

One patient had diurnal frequency of urination which did not respond to any form of treatment.

## ELECTROENCEPHALOGRAPHIC FINDINGS

Electroencephalographic tracings were made on 24 patients, 6 months to 8 years after operation, with a three channel Grass ink-writing instrument. A routine 8-lead monopolar recording was first made with tracings obtained from the frontal, precentral, temporal and occipital areas, with 3 minutes hyperventilation at the end of the record. Following this, bipolar and triangulation technique was employed, with 4 additional electrodes placed at a 3 cm. distance surrounding the operative scar.

Twenty-three of the 24 records showed definite abnormalities bilaterally over the frontal region.

Twenty-one showed high voltage 3 to 7 per second delta waves over the frontal region bilaterally and 2 had delta activity extending to the precentral area. With bi-polar recordings, phase reversal phenomena were observed over the 4 frontal leads, but no evidence of focal discharge was recorded posterior to this area in these 21 cases.

Fourteen showed a marked increase in amplitude and slowing with hyperventilation. Possibly this effect with hyperventilation is due to decreased parasympathetic inhibition subsequent to hypothalamic dysfunction. Darrow *et al.* (13) sectioned the parasympathetic nerves to the pial vessels of cats and obtained slowing and increased amplitude of the brain waves. They believe that these EEG changes were due to decreased cerebral circulation and lowered brain metabolism, following cortical vasoconstriction.

Only 9 of the 24 had normal alpha activity. The remainder of the records included 5 with a low-voltage, rapid irregular pattern and 10 with diffusely abnormal and disorganized tracings.

Table 3 summarizes our findings and Figs. 3, 4, 5, 6 and 7 are sample recordings.

These EEG abnormalities differ from the few reports in the literature on this subject. Davis (14) studied EEGs in 3 lobotomized cases and reported that the fundamental pattern was not altered in any, and in one case that showed 4 per second waves preoperatively there was marked improvement after the operation. Freeman (15) points out that the EEG varies considerably in different cases and at different periods

TABLE III

## ELECTROENCEPHALOGRAPHIC FINDINGS

	No. of records	Increase hyperv.	Seizure pattern
1. Well organized pattern, good alpha. No focal signs.	1	—	—
2. Well organized pattern, good alpha activity. Slow waves from the frontal lobes.	7	4	1
3. Well organized pattern, good alpha activity—6 per sec. disch. in all leads, more in frontals.	1	—	—
4. Diffusely abnormal records. Low voltage rapid irreg. activ. Poor and irreg. alpha. Slow waves in frontal area.	15	9	2
	24	13	3

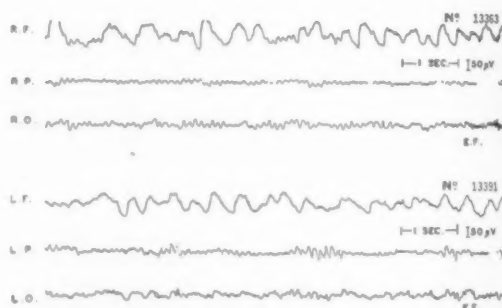


FIG. 3.—Prominent high voltage 2 to 3 per second slow waves, consistently recorded over the frontal areas. This slow activity is closely limited to the frontal region, bilaterally.

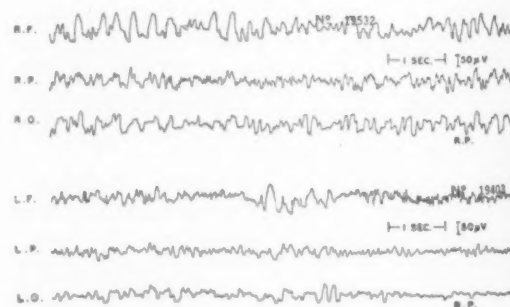


FIG. 4.—Diffusely abnormal record. Medium to high voltage 3 to 6 per second waves were simultaneously recorded in all leads. Note the preponderance of the discharges in the frontal areas. Irregular slow activity is also detected from the occipital region.

following the operation, "but in cases in which the recovery is satisfactory there is apt to be a normal wave pattern."

Hutton and Walter(16) found diffuse

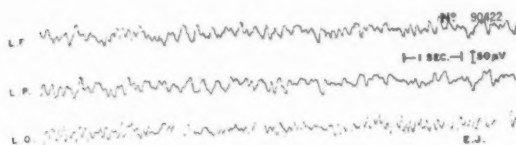


FIG. 5.—Diffusely abnormal record. Medium voltage 4 to 6 per second discharges are recorded from the frontal and parietal areas, bilaterally. The figure illustrates a recording of the left hemisphere.

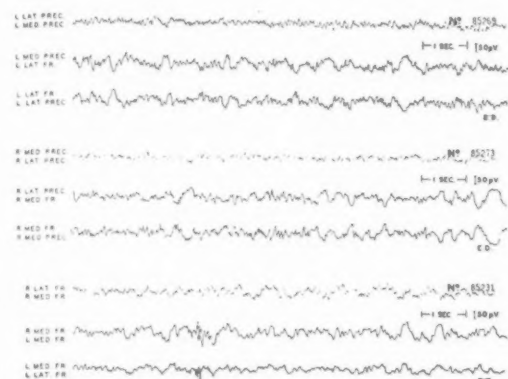


FIG. 6.—Bipolar recordings. Phase reversal focal signs over the left lateral frontal and right medial frontal regions.

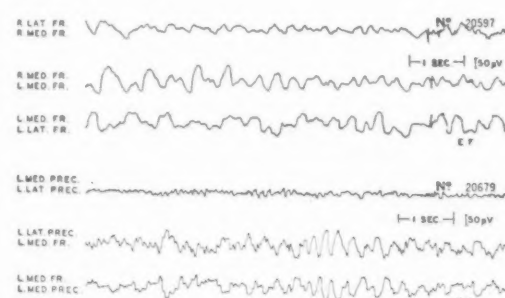


FIG. 7.—No. 20597—transagittal fronto-frontal recording with bipolar technique. Phase reversal and slow waves are consistently recorded over the frontal areas, being more marked in the medial parasagittal region.

No. 20679—Phase reversal focal signs over the left medial frontal area. In addition it can be noted 4 to 6 per second discharges, which appeared intermittently throughout the record, more marked in the anterior leads.

high-voltage slow waves that gradually improved and became more localized to the frontal region over a six-month follow-up period. Cohn(17) reported focal EEG changes more marked in the most rostral parasagittal leads. He states that in some

patients a relatively normal pattern returned in from 1 to 3 months post-operatively but also says that 10 out of 15 showed pronounced EEG abnormalities 4 to 6 years after lobotomy. There was only one post-operative convulsive disorder in his 30 cases.

As indicated, 23 of the 24 tracings in our series showed distinct abnormalities, but there was no correlation between post-operative behavior and the degree of electroencephalographic abnormality. Three EEG seizure patterns were observed, all occurring in patients with clinical epilepsy but 3 other patients with seizures did not show the typical convulsive pattern. Twenty-one of the 24 EEG tracings showed delta waves emanating from the frontal areas bilaterally, the cause of which may be found in any of the determinants already mentioned as possible etiological factors of post-operative epilepsy: focal damage to cortical cells, secondary progressive atrophy of the frontal cortex, irritation by the residual lipidol, etc.

Another possible explanation for the appearance of high-voltage, slow waves is the release of subcortical centers due to transection of the anterior thalamic peduncle. This theoretically would free the subcortical center from cortical domination, allowing these centers to display their characteristic EEG pattern. Grinker and Serota(18), employing animals and human subjects, demonstrated that high-voltage, slow waves emanate from the hypothalamic region, but their conclusions have been severely criticized by Masserman(19, 20, 21). Murphy(22, 23), using strychnine stimulation of the cortical and subcortical areas, has adduced further evidence to suggest that hypothalamic impulses attain a cortical destination by relay through the dorsomedial nucleus of the thalamus. It is this latter structure that Freeman emphasizes as the site of the most advanced atrophy following lobotomy.

Murphy's data further demonstrate that the hypothalamus may be the source of a basic brain rhythm, and indicate the possible existence of a hypothalamic-dorsomedial nucleus-cortex-reverberating circuit.

Of further interest in this connection is Hodge's(24) observation that theta waves (4-7 per second) appear in the EEG in cases of thalamic tumor when the cortex is cut off from the basal ganglia; in cases of children exhibiting aggressive behavior; and in cases of aggressive psychopathic states.

Grey Walter(25) considers that the appearance of this theta rhythm indicates disturbance of thalamic-hypothalamic function.

Thus, it is tempting to postulate that removal of cortical influence is the common cause for both the abnormal EEG pattern and the altered emotionality in the post-lobotomy patient. These changes in emotional response include both categories of Hughlings Jackson: (1) distortion of emotional expression, representing release phenomena; (2) modification of the conscious aspects of emotion representing deficiency phenomena. But further controlled investigations are necessary to confirm this hypothesis.

#### SUMMARY

1. A follow-up study of 30 cases of prefrontal lobotomy was done. Twenty-three of these patients were operated on after admission to St. Elizabeths Hospital after a prolonged incapacitating illness. Of these 23, 21 were benefited by the operation, 11 were considered social recoveries, and 9 were discharged from the hospital. An organic syndrome was substituted for the psychosis. Restitution of the patient's pre-psychotic state should not be expected. One patient was made worse.

2. Protracted illness did not militate against improvement in these selected cases.

3. The criteria employed for the selection of these cases for psycho-surgery are justified by the high percentage of patients that were benefited.

4. No objective neurological signs resulted from the operation.

5. Post-operative convulsions occurred in 10 out of 30 cases.

6. Electroencephalograms of 23 out of 24 cases showed definite abnormalities.

7. There is no correlation between EEG pattern and post-lobotomy improvement.

#### BIBLIOGRAPHY

- Freeman, W., and Watts, J. Psychosurgery, Baltimore, Charles C. Thomas, 1942.
- Ziegler, Lloyd H. Bilateral prefrontal lobotomy. A survey. *Am. J. Psychiat.*, 100: 178, Sept. 1943.
- Kindwall, J. A., and Cleveland, D. Prefrontal lobotomy—fifteen patients before and after operation. *Am. J. Psychiat.*, 101: 749, May 1945.
- Hofstatter, Leopold, Smolik, Edmund A., Busch, Anthony K. Prefrontal lobotomy in treatment of chronic psychoses (with special reference to section of the orbital areas only). *Arch. Neurol. and Psychiat.*, 53: 125-130, Feb. 1945.
- Freeman, W., and Watts, J. Prefrontal lobotomy—Survey of 331 cases. *Am. J. Med. Sci.*, 211: 7 ff., Jan. 1946.
- Hebb, D. O., Ph.D. Man's frontal lobes (A critical review). *Arch. Neurol. Psychiat.*, 54: 10-24, July 1945.
- Freeman, Walter, and Watts, James W. Intelligence following prefrontal lobotomy in obsessive tension states. *J. Neurol., Neurosurg. and Psychiat.*, July 1944.
- Kisker, George W. Remarks on the problem of psychosurgery. *Am. J. Psychiat.*, 100: 180, Sept. 1943.
- Porteus, S. D., and Kepner, R. M. Mental changes after bilateral prefrontal lobotomy. *Genetic Psychol. Monog.*, 29: 3-115, 1944.
- Bennett, A. E., Keegan, J. J., Wilbur, C. B. Prefrontal lobotomy in chronic schizophrenia. *J. A. M. A.*, 123: 809-813, Nov. 27, 1943.
- Ziegler, Lloyd H., and Osgood, Carroll W. Edema and trophic disturbances of the lower extremities complicating prefrontal lobotomy. *Arch. Neurol. Psychiat.*, 53: 262-268, April 1945.
- Meyer, A., Bonn, M. D., Beck, E. Neuropathological problems arising from prefrontal leucotomy. *J. Ment. Sci.*, 91: 411, Oct. 1945.
- Darrow, Chester W., Green, John R., Davis, Edward W., and Garol, Hugh W. Parasympathetic regulation of high potential in the electroencephalogram. *J. Neurophysiol.*, 7: 217-226, 1944.
- Davis, P. A. Electroencephalographic studies on three cases of frontal lobotomy. *Psychosom. Med.*, 3: 38, Jan. 1941.
- Freeman, Walter, and Watts, James W. Behavior and the frontal lobe. The New York Academy of Sciences Section of Psychology. Series II, No. 8, pp. 284-310, June 1944.
- Hutton, E. Lilian, Fleming, G. W. T. H., and Fox, F. Early results of prefrontal leucotomy. *Lancet.*, #2. P. 3, July 5, 1941.
- Cohn, Robert. Electroencephalographic study of prefrontal lobotomy. *Arch. Neurol. Psychiat.*, 53: 283-288, April 1945.
- Grinker, R., and Serota, S. Studies on cortico-hypothalamic relations in the cat and man. *J. Neurophysiol.*, 1: 573, 1930.
- Masserman, Jules H. Is the hypothalamus a center of emotion? *Psychosom. Med.*, 3: 1, Jan. 1941.
- Masserman, Jules H. The hypothalamus in psychiatry. *Am. J. Psychiat.*, 98: 633, March 1942.
- Masserman, J. Behavior and neurosis. Chap. III. Univ. of Chic. Press. 1944.
- Murphy, J. P., and Gellhorn, Ernest. Further investigations on diencephalic-cortical relations and their significance for the problem of emotion. *J. Neurophysiol.*, 8: 431-448, Nov. 1945.
- Murphy, J. P., and Gellhorn, E. The influence of hypothalamic stimulation on cortically induced movements and on action potentials of the cortex. *Jr. Neurophysiol.*, 8: 341-364, 1945.
- Hodge, R. S. The impulsive psychopath; a clinical and electro-physiological study. *J. Ment. Sci.*, 91: 472, Oct. 1945.
- Walter, W. Grey, and Dovey, V. J. Electroencephalography in cases of subcortical tumor. *J. Neurol. Neurosurg. and Psychiat.*, Vol. 7 (New Series) Nos. 3 and 4. July and Oct. 1944.

[Aug.

rontal lobot-  
l. Sci., 211:

al lobes (A  
iat., 54: 10-

s W. Intel-  
in obsessive  
d Psychiat,

the problem  
: 180, Sept.

M. Mental  
my. Genetic

ilbur, C. B.  
hizophrenia.

3. Carroll W.  
e lower ex-  
omy. Arch.

945.  
E. Neuro-  
frontal leu-

945.  
n R., Davis,  
sympathetic  
encephalo-

4. aphic studies  
Psychosom.

mes W. Be-  
New York  
logy. Series

. T. H., and  
leucotomy.

raphic study  
l. Psychiat,

ies on cor-  
and man. J.

othalamus a  
3: 1, Jan.

othalamus in  
March 1942.

rosis. Chap.

est. Further  
relations and  
emotion. J.

E. The in-  
cortically in-  
tentials of the  
1945.

psychopath; a  
y. J. Ment.

J. Electro-  
tical tumor.

Vol. 7 (New  
1944.

## THE EFFECT OF BILATERAL FRONTAL LOBOTOMY UPON THE AUTONOMIC NERVOUS SYSTEM<sup>1</sup>

M. RINKEL, M. D., M. GREENBLATT, M. D., G. P. COON, M. D., AND  
H. C. SOLOMON, M. D.

Boston, Mass.

Bilateral subcortical section of the frontal lobes of the brain was introduced in this country by Walter Freeman and James Watt, in 1936, for the treatment of serious mental conditions. In addition to its therapeutic success, this operation has contributed to the knowledge of the psychological and neuro-physiological functions of the frontal lobes. In the course of the many hundreds of operations, important clinical observations indicated the close relationship of the frontal lobes to the autonomic nervous system. Sudden fall in blood-pressure, relief from indigestion, palpitation and cold hands and feet, gastro-intestinal changes and decrease of the blood sugar level are some of the clinical observations which refer to the sympathetic and parasympathetic nervous systems.

This paper is concerned with a controlled experimental investigation of the effect of bilateral frontal lobotomy upon the human autonomic nervous system. No literature has been found on this subject, with the exception of a preliminary and inconclusive report by F. Reitman on "Autonomic Responses in Prefrontal Leucotomy," in the *Journal of Mental Science*, published in July, 1945, which came to our knowledge, in this country, after our experiments were well under way.

**Method of Investigation.**—A total of 96 patients were examined, of whom 29 had undergone operations, and 17 of these were examined both before and after lobotomy. The control group consisted of 66 individuals, 14 volunteer medical students and nurses and 52 hospital patients, a number of whom had received various forms of shock treatment. The *sympathetic or adrenergic system* was examined with 0.05 mg. of epi-

nephrine, in a 1 cc solution, injected intravenously over a period of 10 seconds. Blood-pressure, pulse-pressure, pulse rate and other adrenergic reactions were recorded. The *parasympathetic or cholinergic system* was examined by physical and pharmacological stimulation of the carotid sinus. Simultaneous electrocardiographic and electroencephalographic tracings were taken, and other clinical manifestations, such as convulsions, were recorded.

**Results.**—Following the intravenous injection of 0.05 mg. of epinephrine, in the control group, the systolic blood-pressure rose on the average of 42.0 mm. Hg. This rise of systolic blood-pressure was approximately the same in the same patients under the same conditions, over a number of consecutive days. The pulse-pressure rose; the pulse rate, in most instances, was moderately increased. In the group of patients who had undergone bilateral lobotomy, there was a great quantitative difference, though qualitatively the change was similar in character. The systolic blood-pressure rose to twice the level of the control group, that is, an average of 85.0 mm. Hg. in the lobotomy cases, as compared with 42 mm. Hg. in the control series. The average of the pulse-pressure rise was 60 mm. Hg., as compared to 24 mm. Hg. in the control group. A comparison of the blood-pressure diagrams of the same patients, before and after lobotomy, strikingly illustrates this observation. Pilo-motor reactions and shivering are frequently seen in lobotomized cases after injection of epinephrine, and not in the control cases. The blood-pressure response to epinephrine, following lobotomy, is about equal to the blood-pressure response in controls after full vagal blocking with atropin.

The *parasympathetic or cholinergic system* was examined by the stimulation of the carotid sinus. We selected this method be-

<sup>1</sup> Abstract of a paper read by title at the 102nd annual meeting of The American Psychiatric Association, Chicago, Ill., May 27-30, 1946.

cause of the low incidence of positive carotid sinus reactions in normal people. The response to carotid sinus stimulation was dramatic in patients whose frontal lobes were sectioned bilaterally. Three groups of reactions were observed:

1. *Slowing of the heart.* This occurred in 84% and was characterized by an increase of the QRS-QRS interval, which was moderate in 44%, and excessive to the extent of heart-block, in 49%.

2. The EEG, in 92%, changed from a basic pattern to a highly abnormal pattern. Following the slowing of the heart, high voltage slow waves, of the 9-5 per second range of frequency were recorded.

3. *Loss of consciousness* and tonic-clonic convulsions occurred in 88%, following, in one or two seconds, the appearance of slow waves in the EEG, and lasted from a few seconds up to one minute or over.

In great contrast, are the results in a group of 8 controls, in which, by history and examination, no mental or physical abnormalities could be detected. In only 3 of this group, the EKG recorded a slight, hardly visible, slowing of the heart rate, and in only 2, a few slow waves in the 5-8 per second range appeared in the EEG. None developed syncope or convulsions.

Quite different, however, was the result in a group of 40 hospital patients with various mental diseases and previous insulin, metrazol or electric shock treatment. In this group, carotid sinus stimulation caused abnormalities in the EKG in 63%, of which 40% were characterized by slight to moderately increased QRS-QRS intervals, and 22.5% by still greater slowing of the heart rate to heartblock. The EEG, in 50%, disclosed high voltage slow waves in the 2-5 per second range. Tonic-clonic convulsions were observed in 42%.

There is no doubt that the mental condition, and particularly previous shock treatment, exerted a tremendous influence upon the effect of the carotid sinus stimulation. The incidence of carotid sinus reaction is considered higher in patients with mental disorders. It is further increased if a patient has received shock treatment of any kind. Our data showed that the effect of carotid sinus stimulation in patients with previous shock treatment was similar to that of those, without previous shock treatment, whose frontal lobes were sectioned. On the other hand, the combination of shock treatment and lobotomy brought up the effect of carotid sinus stimulation to almost 100%, as well as for the EKG, the EEG, and convulsions.

It was interesting to note that atropin and benzedrine sulfate, if given in sufficient amounts, seemed to abolish the carotid sinus reflex, while acetyl-beta-methyl choline seemed to enhance it.

*Summary.*—1. Cortical representations of the autonomic nervous system are located in the prefrontal area.

2. Following the subcortical section of the frontal lobes, the autonomic nervous system becomes more responsive to stimuli from without.

3. Equilibrium reestablished itself on a different level.

4. With the disconnection of the frontal lobe, excitatory and inhibitory influences upon the A. N. S. are abolished, which may explain certain clinical observations such as the fall in blood-pressure in hypertensive patients.

5. Frontal lobotomy which, at present, is performed for the surgical treatment of serious mental illnesses, may, in the future, become a method for the treatment of selected cases of hypertension.

## THE EFFECTS OF ELECTRIC CONVULSIVE THERAPY ON CERTAIN PERSONALITY TRAITS IN PSYCHIATRIC PATIENTS

B. L. PACELLA,<sup>1</sup> Z. PIOTROWSKI, N. D. C. LEWIS

Investigations to determine the effect of electric shock treatment upon the personality structure of psychiatric patients have been previously published (1, 2, 3). The means utilized for detecting these changes have usually consisted of clinical observations and impressions. We considered it of interest to evaluate certain aspects of personality by relatively standardized and objective methods. For this purpose the Minnesota Multiphasic Personality Inventory and the Rorschach Test were utilized. The results were recorded graphically on standardized scoring sheets. Tests were taken both before and after shock treatment in patients diagnosed as psychoneurosis, schizophrenia, manic-depressive psychosis and involutional psychosis. Only those cases who received a minimum of 4 treatments were included in the study; the maximum total number of treatments administered to any one case was 20. The usual course of shock therapy consisted of a series of 6-12 electric convulsive treatments given at the rate of three times weekly. A total of 75 patients was studied, 40 of whom were classified schizophrenia; 24 manic-depressive and involutional psychosis; and 11 psychoneurosis.

All patients were subjected to the Minnesota test before and after treatment. In the majority of instances two post-treatment tests were performed, one taken during the first week after shock treatment and the second test taken from 4 to 8 weeks subsequent to termination of treatment. The reason for recording two post-therapy tests is that during the first post-therapy week the patient may be in a somewhat confused state, with varying degrees of memory disturbance and perhaps temporary disorientation. This "organic" confusion almost completely clears up in 3 to 4 weeks after the termination of treatment. It was, therefore, de-

sirable to compare the results of testing during the period of marked memory disturbance, and subsequently when this period of disturbance had abated. Occasionally, patients manifested temporary clinical improvement only during the immediate confusional period; in these instances, when symptoms of the illness returned, they were usually evident within 3-4 weeks after termination of therapy.

Rorschach tests were given to only twenty schizophrenic patients before and after electric shock therapy; the post-treatment Rorschach records were taken two to four weeks after termination of treatment.

The clinical responses to convulsive therapy were evaluated approximately 4 weeks after termination of therapy so that patients who showed remission of symptoms immediately after therapy and subsequently relapsed, were considered unimproved. Four categories of clinical response to the treatment were arbitrarily considered: 0—unimproved; 1—slight improvement, consisting chiefly in a lessening of anxiety or tension or depressive affect without change in delusional formations or neurotic somatic symptoms; 2—substantial remission of all symptoms, including affect components, delusions, hallucinations, and somatic symptoms; 3—complete recovery with disappearance of all affective, ideational, and somatic disturbances related to their illness.

### RESULTS

The observations made during the Minnesota Tests are shown in Table 1 and Graphs 1, 2, 3, and 4.

It may be noted that in the Minnesota test, 9 personality components are evaluated and scored. These include the following: Hs(hypochondriasis), D(depression), Hy(hysteria), Pt(psychopathic), Mf(homosexual trend), Pa(paranoid), Pt(psychasthenia), Sc(schizophrenia), Ma(mania).

The Minnesota test scores for each personality trait listed above should normally be below 70. Any scores above 70 are con-

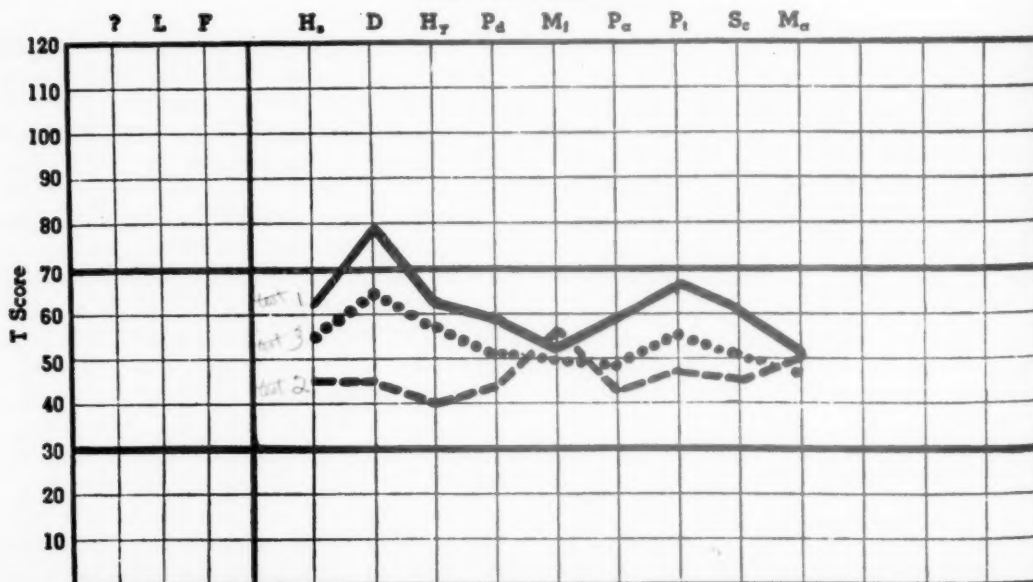
<sup>1</sup> From the Department of Psychiatry, College of Physicians and Surgeons, Columbia University, and the Department of Experimental Psychiatry, N. Y. State Psychiatric Institute and Hospital.

Presented at the annual meeting of The American Psychiatric Association in Chicago, June 1946.

TABLE 1

		AFFECTIVE DISORDERS		SCHIZOPHRENIA (IMPROVED)		SCHIZOPHRENIA (UNIMPROVED)		PSYCHONEUROSIS	
		24 CASES		22 CASES		18 CASES		11 CASES	
	Test no.	Average Scores	Deviation	Average Scores	Deviation	Average Scores	Deviation	Average Scores	Deviation
Hs	1	63.00		60.14		62.11		64.55	
	2	45.82	-17.18	47.85	-12.29	73.20	+11.09	61.09	-3.46
	3	54.69	-8.31	28.50	-31.64	82.17	+20.06	72.83	+8.28
D	1	79.17		68.73		69.67		79.64	
	2	45.76	-33.41	50.90	-17.83	64.73	-4.94	69.27	-10.37
	3	65.92	-13.25	35.38	-33.35	89.83	+20.16	84.00	+4.36
Hy	1	63.29		60.82		63.39		73.64	
	2	40.35	-22.94	48.55	-12.27	59.07	-4.52	59.36	-14.28
	3	56.69	-6.60	42.38	-18.44	70.42	+7.03	75.33	+1.69
Pd	1	58.46		61.91		68.22		66.35	
	2	44.29	-14.17	49.15	-12.76	61.87	-6.55	58.64	-7.91
	3	50.69	-7.77	40.69	-21.22	76.17	+7.95	62.00	+4.55
MF	1	52.88		56.00		55.50		54.82	
	2	55.94	+3.06	55.05	-.95	61.20	+5.70	56.55	+1.73
	3	50.23	-2.65	44.19	-11.81	68.17	+12.67	55.50	+.68
Pa	1	57.75		58.64		60.44		54.82	
	2	43.47	-14.28	43.00	-15.64	52.80	-7.64	54.18	-4.64
	3	49.31	-8.44	37.94	-20.70	65.42	+4.98	66.50	+7.68
Pt	1	65.96		62.41		66.50		69.64	
	2	47.24	-18.72	47.80	-14.61	57.53	-8.97	65.36	-4.28
	3	55.92	-10.04	41.63	-20.78	77.92	+11.42	72.67	+3.03
Sc	1	61.38		65.27		70.33		68.27	
	2	45.65	-15.73	49.10	-16.17	55.67	-14.66	63.00	-5.27
	3	51.00	-10.38	43.44	-21.83	73.92	+3.59	70.83	+2.56
Ma	1	51.29		53.77		56.89		50.00	
	2	49.82	-1.47	50.00	-3.77	48.53	-8.36	48.92	-1.18
	3	46.54	-4.75	47.25	-6.52	52.25	-4.64	49.83	-.17

PROFILE CHART

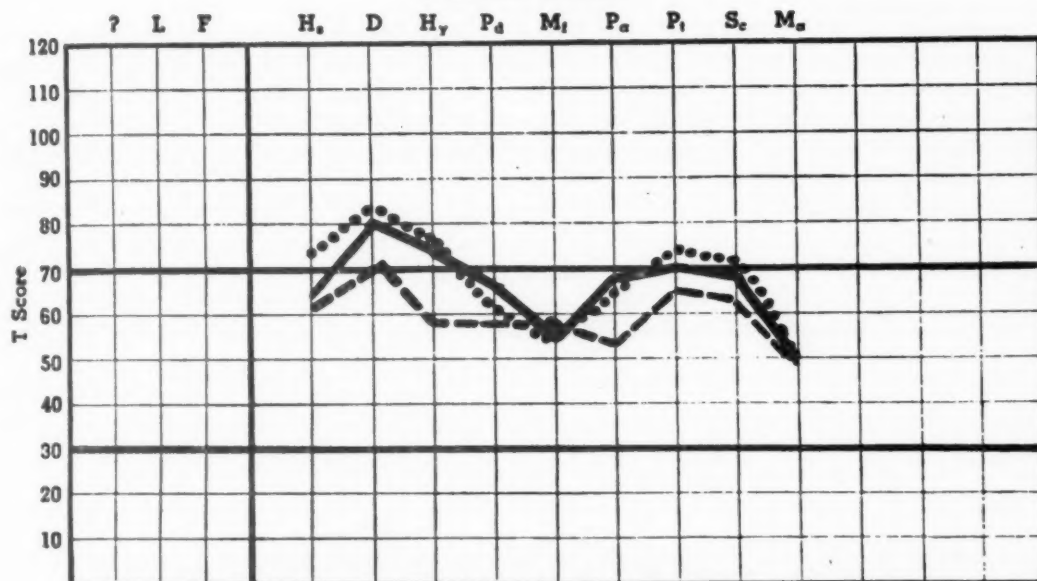


GRAPH I.—The Minnesota Multiphasic Personality Inventory— affective disorders.

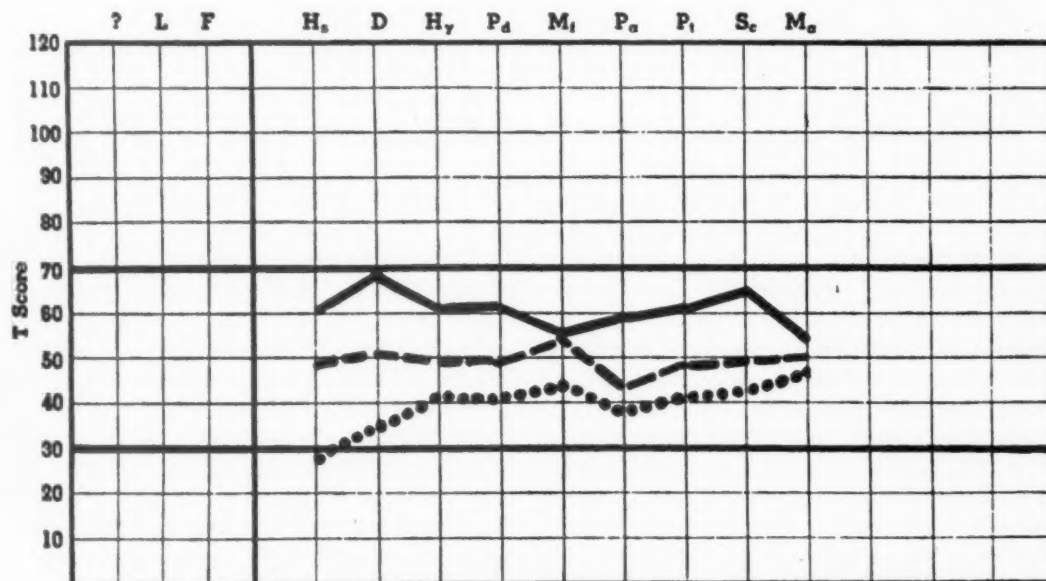
EUROSIS

CASES  
Deviation- 3.46  
+ 8.28- 10.37  
+ 4.36- 14.29  
+ 1.69- 7.91  
+ 4.55+ 1.73  
+ .68- 4.64  
+ 7.68- 4.28  
+ 3.03- 5.27  
+ 2.56- 1.18  
- .17

## PROFILE CHART



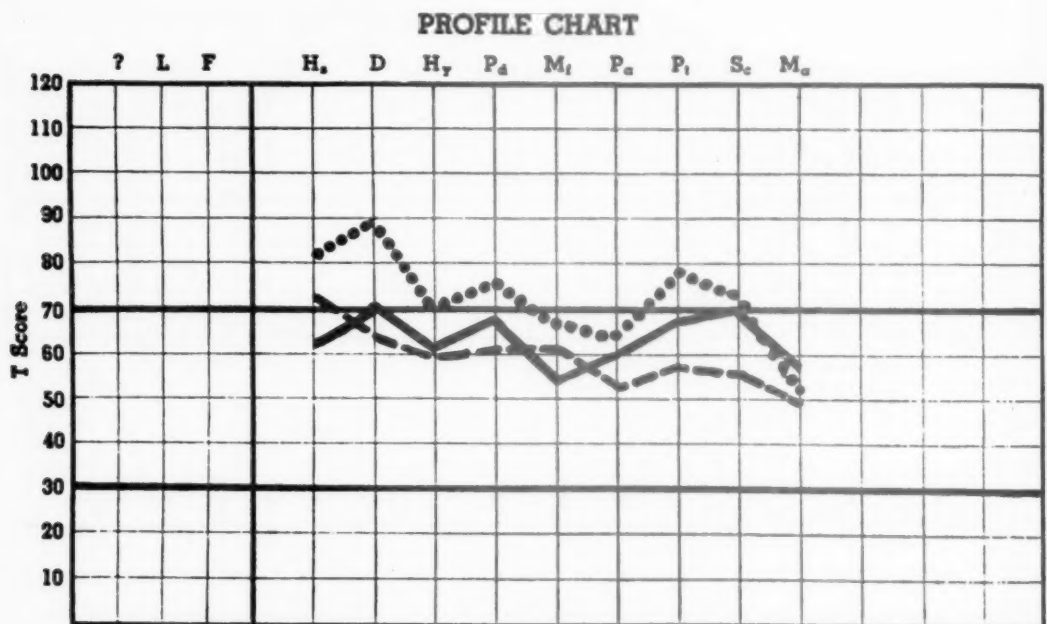
GRAPH 2.—The Minnesota Multiphasic Personality Inventory—psychoneurosis.



GRAPH 3.—The Minnesota Multiphasic Personality Inventory—schizophrenia (improved).

sidered to be an exaggerated degree of that particular personality component and therefore suggest morbidity. The component personality scores for all individuals in each diagnostic group were averaged and plotted on graphs, so that average curves were made for the manic-depressive and involuntal group combined (affective disorders), the psychoneurotic group and the schizophrenic group. In the latter-mentioned, separate graphs were made for those who showed

quently showed scores above 70 not only in the D factor, but in other factors as well, particularly the Hs, Hy, and Pt factors. However, the graph reflects this, since the average scores for these personality components were between 60 and 70. Immediately following termination of shock treatment all scores became lowered upon retesting with the exception of Mf (homosexuality factor) which became slightly elevated, but still remained within the normal



GRAPH 4.—The Minnesota Multiphasic Personality Inventory—schizophrenia (unimproved).

grades 2 and 3 improvement on the one hand (there was no grade 4 improvement), and those who exhibited only grade 1 or no improvement on the other hand. In the psychoneurotic group all patients were averaged together since all were essentially unimproved except for one patient who showed a grade 2 response. In the affective group, since no patient remained entirely unimproved and the great majority showed substantial improvement (grades 2 or 3), all patients were averaged together. Graphs were made of all patients before and after treatment.

It may be observed that in the affective patients the average curve exceeded 70 in only one personality trait, namely in the depressive score. It should be remarked, however that individual graphs of patients fre-

quently showed scores above 70 not only in the D factor, but in other factors as well, particularly the Hs, Hy, and Pt factors. Upon further retesting about 4 weeks after the end of therapy, the second post-treatment studies showed an upswing of almost all the scores, particularly the D, Hy, Hs and Pt scores. It may be noted that the Ma and Mf values remained relatively unchanged with the Mf showing a slightly downward trend, which was the reverse trend of the other scores. At this point, patients were regaining their memory, becoming fully aware of the fact that they had just gone through an emotional illness, and approaching their pre-psychotic level.

In the psychoneurotic group, it may be

noted that the pre-treatment depression score (D) was high, similar to that observed in the affective group of disorders; but in addition, the Hy score is above normal limits and the Pt score is at 70, the borderline top level. Immediately after treatment, the scores showed a general decrease, but not to the extent that was observed in the manic-depressive group. Although the depression score was originally even higher in the psychoneurotic group than in the affective disorders, it may be observed that electric treatment resulted in an average deviation of only 10 points for the psychoneurotic patients, as contrasted with a deviation of  $33\frac{1}{2}$  points for the affective group. In spite of the 10 point dip in the psychoneurotics of the D score immediately after shock treatment, it, nevertheless, did not go below 70. The interesting feature is that in the third test, 4-8 weeks after treatment, the average scores of the D, Hs, Hy, Pt and Sc components were all at a higher level than prevailed before the treatment. The Mf scores and the Ma scores, as in the manic-depressive group, showed very little change. However, the Mf score did show the "inverse reaction" which was evident in the affective group. It might be indicated here that all of the psychoneurotic patients with one exception exhibited only slight temporary improvement or no improvement in the immediate post-shock period. Later, however, at the time the second post-treatment tests were taken, many of these patients were exhibiting an increase in anxiety.

In the schizophrenics considered as improved it may be observed that the pre-shock test showed no average scores which exceeded 70. However, the two highest scores were in the D component (69) and the Sc component (65). Immediately after shock treatment, the average curve resembled in form the curve noted in the M-D patients with the important exception that the percentage of variation in scores between pre-treatment figures and the first post-treatment averages was not as great. Of interest is the fact that the Mf score and the Ma score remained about the same. Very significantly, the final test scores showed a substantial further decrease, particularly in the Hs and the D components. This third curve

is a marked deviation from that observed in the manic-depressive patients, where the final scores all showed elevation (except Mf) particularly in the D component.

The unimproved schizophrenic group yielded a pre-treatment curve which was not remarkably different from that noted in the pre-treatment schizophrenics who improved. The two highest figures were in the Sc and D components, at a level of 70, with the Pd and Pt closely following at averages of approximately 68 and 67 respectively. Immediately after shock therapy the curve showed some lowering of all scores with the exception of the Hs score, which exceeded 70, and the Mf score, which moved upward slightly. The very significant observation, however, was that the second post-treatment scores completely reversed the trend noted in the improved schizophrenic patients. The average scores for all personality factors were elevated, particularly the D, Hs and Pt components. It will be further noted that a similar trend appeared in the psychoneurotic group where the third scores also exhibited significant elevations. Many of the unimproved schizophrenic patients manifested clinically an increase in anxiety, hypochondriasis, as well as paranoid and depressive trends after the immediate post-shock phase had passed.

## RORSCHACH FINDINGS

Twenty schizophrenics were given Rorschach examinations(4) before and after ECT: of these patients eight were much improved, six were improved, and six remained unimproved two to four weeks after termination of treatment when the post-treatment Rorschach records were taken. Little difference was observed between the pre-treatment and post-treatment records of the unimproved patients. There was, however, a difference between the pre- and post-treatment records of the improved patients. This is in accordance with the general experience that the Rorschach records parallel fairly closely clinically marked changes in the patient's personality. However the difference was not so great as to be conspicuous in those components of the Rorschach which are usually tabulated. Table 2 summarizes some of the more important components.

Perhaps the most significant conclusion from this table is that those schizophrenics who benefited from ECT have shown less deviation from the norm of the average healthy adult than those who did not benefit from ECT. The same conclusion was reached previously when a group of insulin-treated schizophrenics had been studied. The smaller deviation of the improved group from the norm established by healthy adults is indicated by such components as human move-

characteristic perceptanalytic (Rorschach) feature of schizophrenics was the great difference in the quality of their best and most adequate responses on the one hand and the poor responses on the other. Such unexpected variations in the quality of the performance level are typically schizophrenic, not only clinically but in perceptanalysis as well(4). The frequency and the range in this qualitative variation of the performance level were significantly reduced after suc-

TABLE 2

## PRE-TREATMENT AVERAGES

	N	R	W	d	M	CR	Cn	F+%
Much Improved	8	20.7	8.2	1.8	2.7	2.6	—	79
Improved	6	18.9	6.5	2.1	1.6	2.3	—	71
Unimproved	6	21.4	5.1	4.8	.6	1.1	.9	54
Total	20	20.4	6.8	2.8	1.7	2.1	.3	69

## POST-TREATMENT AVERAGES

	N	R	W	d	M	CR	Cn	F+%
Much Improved	8	26.5	7.2	2.3	2.9	2.8	—	86
Improved	6	20.8	6.0	.8	2.0	3.1	—	78
Unimproved	6	19.4	5.3	4.6	.5	1.9	1.7	52
Total	20	22.7	6.3	2.5	1.9	2.6	.5	73

ment, or M; color responses, or CR; as well as the percentage of sharply conceived forms, or F+%. These findings indicated that the variety and intensity of psychological experiences of the improved group were more like those in the healthy group, than in the unimproved group. The capacity for prolonged and directed voluntary attention was also superior in the improved group.

The post-treatment Rorschach records of even the most improved schizophrenics show such basic similarities with the pre-treatment records of the patients as to suggest that apparently no basic personality change takes place in the schizophrenics as a result of ECT. It requires a more detailed analysis of the records to point out changes after successful treatment. Perhaps the most significant change is a reduction in the variability of the performance level. The most

successful ECT. Associated with this change was a drop in secondary elaboration. Some of the most absurd ideas of the schizophrenics were contained not in the percepts originally elicited by the Rorschach plates but in the secondary elaboration prompted by these percepts. After successful treatment, the schizophrenic came much more rapidly to the point, refraining from his usual wandering. In this respect ECT and insulin treatments do not appear to differ significantly.

## DISCUSSION

From the Rorschach evidence at least, the impression was gained that one of the effects of a successful ECT was the improved capacity of the patient to be on his guard in disclosing his personality deficiencies. The restraint in the secondary elaboration of his

orschach)  
great dif-  
and most  
d and the  
ch unex-  
the per-  
phrenic,  
analysis as  
range in  
formance  
fter suc-

ideas seems to be correlated with the patient's unwillingness to discuss freely his subjective complaints. It is likely that this perceptanalytic finding corresponds to the schizophrenic's so-called lack of insight which can be observed so frequently even after very successful treatment. The basic personality defects were still largely retained but successful treatment enabled the patient to be more prudent in manifesting these defects even to his physician. This seemed to be particularly true of the paranoid schizophrenics.

Qualitative analysis of the pre- and post-treatment Rorschach record of our twenty ECT schizophrenics suggested that improvement seemed to consist mainly of a reduction of the patient's subjective disturbance by a psychosis, the psychosis itself undergoing apparently little change (5, 6). This reduction in the fear of the psychosis enables the patient to make better contact with his environment (7, 8). After successful ECT, the patient can make more efficient use of whatever capacities he still possesses. Schizophrenics who are not markedly disturbed by their psychosis and personality changes associated with the psychosis do not seem to benefit from ECT even if their personalities do not seem to have deviated very conspicuously from the norm of healthy adults (9).

A number of negative and positive conclusions may be drawn from the data obtained by the Minnesota Multiphasic Personality Inventory and the Rorschach Test:

1. The Minnesota Inventory cannot be used as a dependable diagnostic aid. The authors of the Minnesota Inventory report that the Inventory correctly identifies patients clinically diagnosed as schizophrenic in 64%. In our 75 patients the Minnesota differentiated schizophrenics from non-schizophrenics with about the same degree of accuracy, *i.e.*, in 61% of our 75 cases. Taking a score of 70 or above on the schizophrenic scale as suggestive of schizophrenia and any score below 70 as not indicating schizophrenia, the Minnesota detected only 20 or exactly one-half of our 40 schizophrenics. Nine of our 35 non-schizophrenics also received scores indicative of schizophrenia according to the Minnesota. There was no difference in the degree of accurate

recognition between the improved and unimproved schizophrenics. This very high degree of error is understandable if one considers that the Minnesota like all other personality inventories, cannot determine the degree of intellectual deviation. The patient must admit the false nature of his hallucinations and delusions, the psychogenic origin of his somatic complaints, and other psychopathological features before his score on the Minnesota schizophrenia scale can become significantly high.

The recognition of a manic-depressive depression by means of the Minnesota is even less valid. It was correct in only 57 percent of our 75 patients. Nineteen of our 24 manic depressives and 27 of our non-manic depressives obtained significantly high scores (70 and above) on the depression scale, which suggested a manic-depressive depression according to the norms provided with the Minnesota Inventory. Thus the diagnostic validity of the Minnesota was so low as to make the test impractical as a diagnostic aid especially in difficult problems of differential diagnosis.

2. The Minnesota was also a failure as a prognostic aid. A glance at the pre-treatment scores of the schizophrenics who benefited from treatment and of those who did not, reveals no significant differences whatever. Thus the Minnesota would not be helpful in the selection of proper patients for treatment.

3. However, the Minnesota appeared to have a limited prognostic value when used one week after termination of treatment for determining whether or not the patient would retain any improvement that had taken place. In the schizophrenic group there appeared, within a week after termination of treatment, significant differences between the patients who remained improved and those who showed no persisting improvement. If the score immediately after treatment dropped below the pre-treatment score by at least 10 points on the hypochondriasis, depression, hysteria and psychopathic-deviation scales, then the improvement was maintained. It is of interest to note that the immediate post-treatment examination revealed such differences between improved and unimproved schizophrenics, especially since most patients at that time still suffered from memory and

F+%
79
71
54
69

F+%
86
78
52
73

is change  
on. Some  
e schizo-  
percepts  
ch plates  
prompted  
ful treat-  
uch more  
from his  
ECT and  
to differ

least, the  
he effects  
proved ca-  
guard in  
ies. The  
on of his

other disturbances associated with ECT. No examinations were made later than 3 months following treatment; consequently nothing can be said regarding the possibility of later relapses.

4. In the unimproved schizophrenics and psychoneurotics, the second post-treatment tests taken one to two months after termination of treatment yielded higher scores than the pre-treatment tests. In this manner the Minnesota reflected the increase in symptomatology and anxiety which these patients frequently had when they realized that shock therapy had not helped their condition. It is possible, also, that the treatment had weakened the patients' defense mechanisms and thus enabled the deepseated anxieties, phobias, etc., to become more pronounced.

In contrast to the Minnesota and other personality questionnaires which were not helpful as diagnostic or prognostic aids, the perceptanalytic test of Rorschach was a valuable prognostic and diagnostic aid. The Rorschach findings paralleled the personality changes observed clinically. Even before treatment there was a significant difference between the Rorschach records of improved and unimproved schizophrenics treated with ECT.

The improvement after shock therapy seemed to depend on two different factors. One condition for improvement was the presence of only mild or no intellectual regression. In other words, the patient's intellect should not be markedly affected by the psychosis. The other condition was that there be a marked discrepancy between the potential and the actual level of the schizophrenic's mental or psychological functioning. The greater this discrepancy, the greater the improvement seemed to be, other conditions being equal.

According to the Rorschach findings, the discrepancy between the potential and actual mental functioning was apparently correlated with the schizophrenic's anxiety engendered by his awareness of the personality changes which had taken place as a result of the psychosis. To use simple language, many schizophrenics "exaggerate" the effect of the psychosis upon their personalities. They become unduly anxious and withdrawn in an apparent attempt to minimize the chances of maladjustment and conflict with the environ-

ment. Some become anxious and agitated as if trying to escape painful insight into their personality deficiencies by means of a vigorous and usually sudden increase in motor activity. The patients seem so preoccupied with their anxiety and what might be termed their attempts to cure themselves of the anxiety that they neglect to function as well as they could in objective reality and in social relationships. If anxiety and depression are secondary results of the psychosis, then successful shock therapy removes these secondary effects of schizophrenia (6). According to available Rorschach evidence, schizophrenics whose actual psychological performance level is near their potential level do not improve even when these patients show very few, or no primary intellectual deficiencies caused by the psychosis (7, 9).

The following personality changes have been observed in schizophrenics by means of the Rorschach method after a successful treatment: the patients became much more concise; they were less circumstantial; the logical coherence of their reasoning was improved. There was usually a definite improvement in the capacity for consciously directed and prolonged voluntary attention. They showed more control in thought and action. They were emotionally calmer and less sensitive. At the same time they appeared emotionally duller. These results probably can be explained fully by a decrease of emotional pressure. The decrease in anxiety and depression reacted favorably upon intellectual functioning. Thus, although there seemed to be no real improvement in intellectual capacity, the improvement in intellectual efficiency was very noticeable. The decrease in anxiety through successful treatment resulted in a lesser stimulation of imagination and thus revealed more clearly the emotional impoverishment of the schizophrenic.

Finally, as far as the perceptanalytic test of Rorschach is concerned, there seemed to be no difference in its prognostic value whether used in insulin coma treatment or in ECT.

#### SUMMARY

Personality studies were conducted on a group of 75 psychiatric patients classified

as psychoneurosis, schizophrenia, manic-depressive psychosis and involutional psychosis, before and after a course of electric convulsive therapy. The personality tests were made by means of the Minnesota Multiphasic Personality Inventory and the Rorschach perceptanalysis. The extent to which these tests may be utilized for evaluating the effects of electric shock therapy upon the personality structure are discussed. The diagnostic and prognostic value of these examinations are commented upon.

NOTE.—We wish to thank Miss Mary Szczerba for technical assistance in examining patients by means of the Minnesota Multiphasic Personality Inventory test and for her aid in the preparation of the graphs and tables.

#### BIBLIOGRAPHY

1. Myerson, A. Borderline cases treated by electric shock. *Am. J. Psychiat.*, **100**: 355-357, 1943.
2. Millet, J. A. P., and Mosse, E. P. On certain

psychological aspects of electroshock therapy. *Psychosom. Med.*, **6**: 226-236, 1944.

3. Moriarty, J. D., and Weil, A. A. Healing mechanisms in the shock-treated neurotic patient. *J. Nerv. and Ment. Dis.*, **101**: 205-214, 1945.

4. Rorschach, H. *Psychodiagnostics: a personality test based on perception*. H. Huber (Berne, Switz.), 1942, Engl. transl.

5. Katz, H. Rorschach investigations on schizophrenics treated with insulin. *Monatschr. f. psychiat.*, **104**: 15-33, 1941.

6. Piotrowski, Z. A. The Rorschach method as a prognostic aid in the insulin shock treatment of schizophrenics. *Psychiat. Quart.*, **15**: 807-822, 1941.

7. Kisker, G. W. A projective approach to personality patterns during insulin-shock and metrazol-convulsive therapy. *J. Abn. Soc. Psychol.*, **37**: 120-124, 1942.

8. Piotrowski, Z. A. Rorschach manifestations of improvement in insulin treated schizophrenics. *Psychosom. Med.*, **1**: 508-526.

9. Piotrowski, Z. A. The prognostic possibilities of the Rorschach method in insulin treatment. *Psychiat. Quart.*, **12**: 679-689, 1938.

agitated  
ight into  
ans of a  
crease in  
so pre-  
at might  
emselves  
function  
ality and  
and de-  
the psy-  
rapy re-  
f schizo-  
ble Ror-  
se actual  
near their  
en when  
o primary  
e psycho-

ges have  
means of  
successful  
uch more  
ntial; the  
g was im-  
finite im-  
onsciously  
attention.  
ought and  
lmer and  
they ap-  
se results  
a decrease  
se in anx-  
ably upon  
ough there  
t in intel-  
n intellec-  
. The de-  
sful treat-  
ulation of  
ore clearly  
the schizo-

alytic test  
seemed to  
stic value  
ment or in

ucted on a  
s classified

## EFFECTS OF CEREBRAL ELECTROSHOCK ON EXPERIMENTAL NEUROSES IN CATS <sup>1</sup>

JULES H. MASSERMAN, M. D., AND MARY GRIER JACQUES, M. S.

Chicago, Ill.

Initial animal experiments in our laboratory had demonstrated that drugs such as morphine(36), amytal(24) or alcohol(25, 26) which impaired cortical function(9, 22) thereby disorganized patterns of learned behavior to a degree roughly proportional to their complexity and relative recency of acquisition. Accordingly, when such drugs were administered to animals which had been subjected to acute motivational conflicts(19), the induced inhibitions, phobias, compulsions and other complex neurotic patterns were temporarily disintegrated, permitting the previously established goal-directed responses to reappear. To investigate the possibility that cerebral electroshock might have corresponding effects on "normal" and "neurotic" behavior, the following experiments were performed.

### METHODS

*Preliminary Training.*—By the use of an automatic apparatus described in previous communications(19) 8 cats were trained to lift the lid of a box for a pellet of food and then to delay this response until a bell and light signal had been given. Seven of these animals next learned to close an electric switch <sup>2</sup> that actuated the signals and feeder; finally, these animals were taught to walk away from the food-box around a glass barrier in order to reach and operate the switch in various positions.

*Induction of Neurosis.*—In 6 of the animals so trained an experimental neurosis was induced by subjecting them to an air-blast or electric shock at the moment of condi-

tional food-taking, then repeating this conflict-engendering experience from two to seven times at irregular intervals. As described elsewhere in detail(19), this procedure induced various neurotic aberrations of behavior which in the present experiments were observed and graded according to the criteria listed in Table 1. The daily mean of these gradings, as demonstrated in previous control studies(23, 26), furnished a statistically reliable "neurotic index" of the intensity of these aberrations in animals subjected successively to repetitions of the conflictful stimuli, exposure to cerebral electroshock, re-testing in the apparatus and later retraining procedures (Table 2).

*Technique of Electroshock.*—After the experimental neurosis had become stabilized over a period of from six weeks to a year, all of the neurotic animals and two normal controls (Table 2) were subjected to a course of cerebral electroshocks calculated to apply to the cat the dosages of current used in clinical therapy. The electrodes were copper strips 4 cm. square coated with conducting jelly and held by means of a plastic arch so as to conform closely with the cranium. The course consisted of ten applications at two or three-day intervals of a 30-volt 60-cycle current passed for five seconds through the cerebrum. During each convulsion the animal was suspended in a cloth hammock, from which it was removed to an observation cage after the tonic movements had ceased.<sup>3</sup>

*Anatomic Controls.*—After from one day to 12 weeks of further observation and re-testing in the experimental situation, the animals were anesthetized by the intraperitoneal injection of 6 cc. of 6 percent nembutal. The brains were then removed, fixed in formalin, embedded in celloidin and sec-

<sup>1</sup> Read at the 102nd annual meeting of The American Psychiatric Association, Chicago, Ill., May 27-30, 1946.

From the Department of Nervous and Mental Diseases, Northwestern University School of Medicine, and the National Foundation for Psychiatric Research, Chicago.

<sup>2</sup> The eighth animal was a kitten which had learned the signal-responses at the age of two months but had not been taught to use the switch.

<sup>3</sup> The authors are indebted to Dr. A. E. Walker and Mr. J. Kohlross of the Department of Neurosurgery, University of Chicago, for their cooperation in this portion of the research.

TABLE 1

## EXPERIMENTAL OBSERVATIONS AND SCALE OF RATINGS \*

## I. Food Avoidance

- 0 Feeds freely on pellets
- 1 Erratically or on fish only
- 2 From box only when guided
- 3 Hand feeding only
- 4 Special food only
- 5 Rejects all food

## II. Food Box Avoidance

- 0 Avidly opens box
- 1 Spontaneous but distractible
- 2 Feeds only if lid open
- 3 Approaches when guided
- 4 Resists guidance
- 5 Actively avoids food box

## III. Switch Avoidance

- 0 Works switch spontaneously
- 1 Works switch with guidance
- 2 Use irregular or sporadic
- 3 Hesitant and incomplete
- 4 Will not use switch
- 5 Shows active avoidance

## IV. Fear of Signal

- 0 No fear of signal
- 1 Slight startle
- 2 Occasional fear, submaximal
- 3 Occasional fear, maximal
- 4 Consistent fear, submaximal
- 5 Consistent fear, maximal

## V. Situational Retreat

- 0 Enters rear † only for switch
- 1 No preferred position in cage
- 2 Prefers rear; emerges for signal
- 3 Remains in rear unless guided
- 4 Resists guidance from rear
- 5 Tries to get to rear even when obstructed

## VI. Fear of Constriction ‡

- 0 None, feeds on signal
- 1 Slight restlessness but feeds
- 2 Leaves food at movement of barrier
- 3 Ignores signal when constricted
- 4 Phobic reactions increased when constricted
- 5 Panic reaction when constricted

## VII. Apparatus Avoidance

- 0 Active efforts to enter cage; remains
- 1 Indifferent to entry or removal
- 2 Leaves apparatus for outside attraction
- 3 Indifferent to entry; later attempts escape
- 4 Sustained phobic reactions to placement
- 5 Violently resists entry; attempts escape

## VIII. Hypersensitivity

- 0 Response focused on feeding situation
- 1 Alert but not distractible
- 2 Over-alert, distractible
- 3 Occasional generalized startle
- 4 Frequent generalized startle
- 5 Generalized phobic response (crouching, panic)

## IX. Avoidance of Experimenter

- 0 Dependent, seeks petting
- 1 Friendly, spontaneous
- 2 Tolerant only
- 3 Indifferent, solitary
- 4 Attempts escape
- 5 Active hostility

## X. Motor Disturbance

- 0 None
- (1) Hyperactive
- (3) Tics
- (5) Convulsions
- 1 Hypoactive
- 3 Immobile
- 5 Catalepsy

## XI. Substitutive Behavior

- 0 None
- 1 Preening, playing, rubbing
- 3 Deviant responses (prolonged switch pressing, excessive clawing, pacing, rituals)
- 5 Persistent bizarre responses

## XII. Autonomic Changes

- 0 None grossly observed
- 1 Horripilation, pupillary dilation, vascular dilation
- 3 Trembling, tachycardia, irregular breathing, salivation, retching
- 5 Vomiting, urination, defecation

\* These ratings were employed in calculating a mean "neurotic index" which was useful in comparing the behavior of one or more animals under various conditions and at various times. While this index was found to be valid for statistical purposes, the patterns individually graded are not to be considered as independent variables in a behavioral continuum.

† "Rear" refers to the portion of the cage away from the food-box and entered with some difficulty around a glass barrier.

‡ Fear of constriction was tested by moving the barrier slowly to a point 14 in. from the food-box, giving the feeding signal, and then moving the barrier back toward the box.

TAL

g this con-  
m two to  
ls. As de-  
this proce-  
errations of  
experiments  
ding to the  
daily mean  
ed in prev-  
ished a sta-  
ex" of the  
animals sub-  
of the con-  
bral electro-  
s and later  
).

—After the  
ne stabilized  
to a year, all  
normal con-  
to a course  
ted to apply  
ent used in  
were copper  
a conducting  
lastic arch so  
ranium. The  
tions at two  
volt 60-cycle  
through the  
sion the ani-  
h hammock,  
an observa-  
vements had

from one day  
ation and re-  
ituation, the  
he intraperi-  
percent nem-  
moved, fixed  
idin and sec-

A. E. Walker  
ment of Neuro-  
their coopera-

tioned sagittally. Twelve sections from each brain were then stained serially by H. & E., Nissl and Niemer techniques for microscopic examination.

### RESULTS

The results may be summarized as follows (cf. Table 2 and Plate 3).<sup>4</sup>

*Effects of Electroshock on Neurotic Behavior.*—In general, all neurotic patterns showed progressive disintegration during electroshock therapy, *i. e.*, all of the neurotic

simple switch-manipulation and other goal-directed patterns that had been relatively well established before the induction of the neurosis. The latter effects were particularly evident in cat No. 2 which had been given only two trials in the apparatus during the course of the electroshock therapy. This animal had been markedly inhibited and phobic in the experimental cage before treatment, yet two hours after the tenth electroshock the animal readily re-entered the apparatus, operated the switch efficiently and

TABLE 2

Anim. no.	Neurotic index before shock *	Duration of neurosis	No. runs during shock series	Neurotic index 24 hrs. after shock no. 10	Follow-up	Rating index last run
1	3.91	Over 12 mo.	27	0.50	10 weeks	0.00
2	2.08	6 weeks	2	0.41	8 weeks	0.41
3	3.84	12 weeks	27	2.23 †	12 weeks	0.33
4	2.33	Over 12 mo.	27	0.36	1 week ‡	—
5	2.00	4 weeks	0	1.58 §	4 weeks	0.53
6	0.30	None	0	1.16	1 week	0.00
7	0.09	None	27	0.54	1 day	—
8	2.58	6 weeks	27	0.33	6 weeks	0.08

\* Cf. Table 1 and footnote. An index of less than 1 generally represents no or mild irregularities; 1 to 2, moderate neurosis; 2 to 3, marked neuroses; above 3, severe neurosis.

† Cat No. 3 lost the specific phobias associated with its neurosis, but developed marked general anxiety in the course of shocks. There was a gradual recovery with guidance during the follow-up period, although a similar period of guidance before shock had been ineffective.

‡ Cat No. 4 died of an intercurrent distemper at the end of this period.

§ Cat No. 5 lost his neurotic symptoms after the shock series, but did not feed normally until after medication for intestinal parasites one week later, after which the rating index dropped to .08.

animals showed lessened physiologic manifestations of anxiety in the locale of the experimental cage, diminishing startle and phobic reactions to the feeding signals or to space constriction, disinhibition with regard to opening the food-box, passing the barrier or operating the switch, and a mitigation of cataleptic motor disturbances and of compulsive and regressive behavior. These effects appeared within two hours after the first or second electroshock but generally retrogressed within 24-48 hours until the fourth shock, subsequent to which improvement became continuous in three of the 4 cats tested in the apparatus (Fig. 1). Concurrently, in 5 of the 6 neurotic animals there was a progressive reappearance of exploratory activity, responses to signals,

fed at the ensuing signal without hesitation. Cat No. 5 which had not been tested in the apparatus at all during the course of the electroshocks at first showed considerable lethargy at the completion of the therapy; however, when a complicating intestinal infestation was discovered and treated about a week after the last shock a marked and immediate improvement in behavior occurred.

*Loss of Adaptive Capacities.*—Nevertheless, while this restitution toward relatively "normal" behavior was observed in all of the animals (Table 2, columns 6 and 7) and remained stable during periods of up to 12 weeks after the electroshocks were discontinued, other deficits appeared and persisted. Thus, the animals showed a general loss of spontaneity and initiative, occasional disorientations for space and timing of action, variable fragmentation and stereotypy of movement, difficulty in shifting from one response pattern to another (*i. e.*, signal-response to switch-manipulation), a ten-

<sup>4</sup> The methods and results of these experiments are also recorded on a 16 mm., 700 ft., fully subtitled motion picture film. "Electroshock Therapy in Experimental Neuroses," prepared by the authors and distributed by the Psychological Cinema Register, State College, Pennsylvania.

tendency to remain "stimulus-bound" (*e. g.*, keeping the head in the food-box between signals) and, most evident of all, a marked impairment in the efficiency and facility with which the animal performed complex, recently-learned patterns such as passing the

with improvement in 24 hours; after the third shock there occurred more persistent difficulties in opening the food-box, and after the fourth there was increasing bewilderment, fragmentation of behavior and perseveration in the patterns of switch-manipulation.

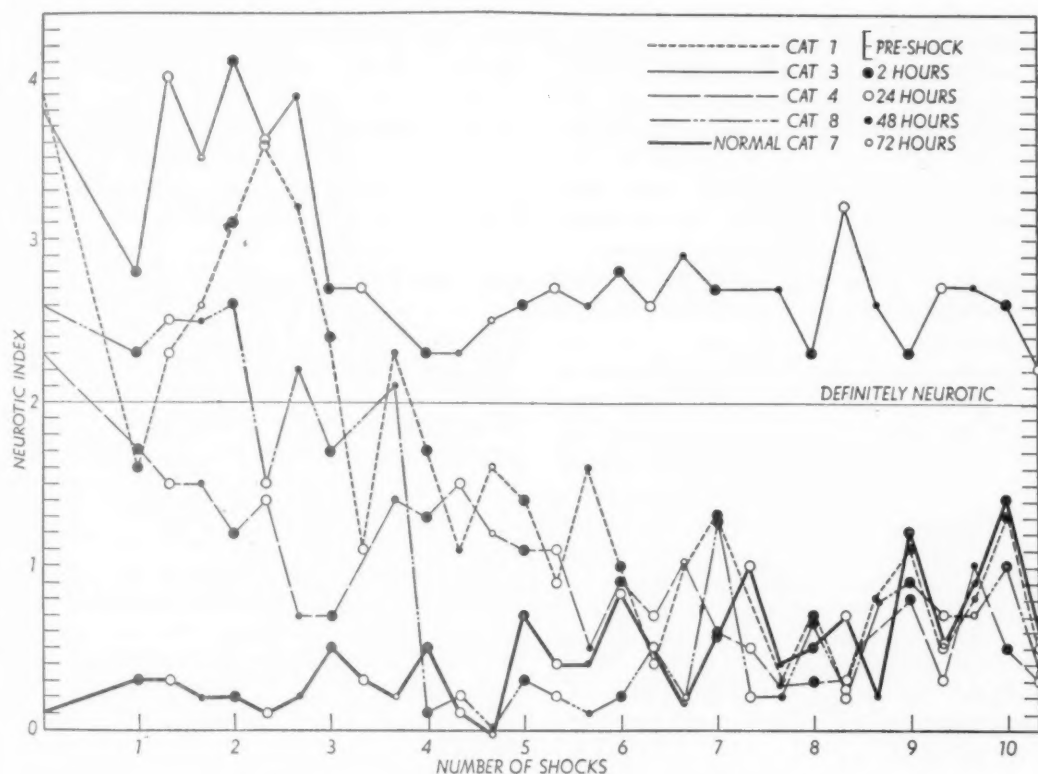


FIG. 1.—Sample effects of cerebral electroshock on normal and neurotic behavior in cats. In the neurotic animals Nos. 1, 4 and 8 each shock produced definite alleviation of neurotic patterns in two hours, although with fairly consistent retrogression at 24, 48, and 72-hour intervals until after the fourth or fifth shock. Animal No. 3, however, after an abortive second shock developed generalized phobic reactions which kept its neurotic index high (see text). In the normal animal (No. 7) progressive failures in complex switch-manipulation and other behavioral deficits gradually raised the neurotic index throughout the course of the electroshocks.

barrier and operating the signal-switch in difficult positions.

**Effects on Normal Behavior.**—Of the 2 normal animals subjected to electroshock, the one (No. 7) given daily runs in the apparatus during the course of electroshock treatment showed the following changes in behavior: Two hours after the first shock there was a transient loss of spontaneity in passing the barrier to reach the switch; after the second shock there was occasional spatial disorientation (*e. g.*, attempts to use the wrong passage around the barrier) again

lution and feeding. These became more persistent until, after the eighth shock, failures to use the switch, delays in signal-response, frustraneous opening of the food-box between signals (reversion to an early training pattern) and other deficits in adaptation as long as 72 hours after shock were reflected in a gradually rising "neurotic index" (Fig. 1, curve 7). Similar deficits were apparent in cat No. 6, which was not run in the apparatus during the course of the electroshocks; *e. g.*, 2 hours after the last shock the previously well-learned responses to the

signals with the food-box closed were obliterated, although they were easily restored by opening the box to display food. Similarly, the animal did not resume its accustomed use of the switch until it had accidentally depressed the switch-platform on several occasions; even thereafter the animal used the switch only when the latter was placed in proximity to the food-box. In other words, following electroshock the control animals, like the neurotic ones, showed loss of spontaneity, disorientations in time and space, difficulties of retention, constriction of perceptive and integrative fields, and fragmentation or disintegration of complex adaptations, as contrasted with the relative preservation of the simpler and more stable response-patterns that had previously been established.

*Contributory Observations.*—A number of phenomena relevant to certain biodynamic principles of animal behavior (20) also appeared in these studies and may be noted briefly under the following headings:

*Motivation.*—Even after electroshock had partially disintegrated the neurotic symptoms of our experimental animals it was apparent that the resumption of former patterns of adaptation still depended on the degree of normal motivation that could be reinduced. For example, hunger had to be evoked before effective signal-responses would reappear, and performance could be improved by use of especially tempting foods. As an instance of pathologic factors in this connection, cats No. 5 and No. 8 showed little or no recovery of normal feeding after electroshock until their intercurrent parasitic infestations had also been treated.

*Relative Experiential Evaluations.*—Animal No. 3, because of a defective electrode, received insufficient current at the time of the second electroshock to induce a complete convulsion with unconsciousness. Significantly, this animal thereafter showed specific fear of the electrodes, hammocks and Variac and manifested such general uneasiness in the laboratory that, despite the fact that its fear of the feeding-situation had not been resolved, it preferred to escape from the room into the experimental cage. Here a change of the food-reward from

dried meat to pellets of fish served to re-establish the signal responses in ten more days of testing, but even at the end of the course of electroshocks the neurotic index was still relatively high (Fig. 1); indeed, eleven additional weeks of special indulgences and retraining in the laboratory were required before further improvement could be secured (Table 2). Cat No. 1 also had an abortive second shock that did not appear to abolish consciousness, but its subsequent phobic reactions were less severe. The shocks seemed to induce immediate unconsciousness in all other instances, yet it is significant that six of the animals, although ordinarily friendly, often became actively resistant while being prepared for the treatments, and two of them (Nos. 3 and 6) showed marked evidences of anxiety under such circumstances. It is noteworthy that in these animals the amnesia and phobic associations were anterograde: *i. e.*, there was little struggling in the apparatus itself, but the handling of the animal preparatory to shock produced physiologic manifestations of fear.

*Cerebral Changes after Electroshock.*—All of the stained sections from the electroshocked brains were examined independently by three observers,<sup>5</sup> along with corresponding sections from two trained animals (Nos. 9 and 10) not exposed to electroshock. To add to the objectivity of these examinations the sections were labeled so as to furnish no information about the particular experimental procedure employed in the animal from which they had been taken. The consensus of these observers was that definitely pathologic changes occurred only in cat No. 4. The brain sections from this animal showed slight thickening of the basilar meninges, dilated vessels in the sulci, perivascular and subpial bleeding and, possibly, unidentified cellular inclusion-bodies (R.R.); however, this animal (cf. Table 2) had died of an intercurrent acute distemper six days after the last electroshock. The other sections occasionally showed vascular or capillary engorgement, slight distention of the Virchow-Robin spaces and scattered sub-

<sup>5</sup> Thanks are due to Dr. Richard Richter of the Department of Medicine, and to Dr. Jack Woolf, Department of Neurosurgery of the University of Chicago, for cooperating with one of us (J.H.M.) in this portion of the study.

pial h  
were  
shock  
the e  
post  
the s  
mark  
that  
patho  
plates  
ences  
portio  
and  
less  
chang  
duced  
the a  
serve

"T  
Our  
cereb  
(a) l  
react  
terns  
pulsio  
direct  
forcia  
tation  
estab  
patte  
meth  
empl  
tions  
forc  
sidua  
ment  
final  
lems  
part  
loss  
*e. g.*  
ing  
had  
effic  
form

P  
conv  
elect  
by  
<sup>6</sup> P  
refer

pial hemorrhages, but since these changes were minimal and also appeared in the unshocked controls, they seemed attributable to the effects of the terminal anesthetic or to post-mortem artifacts. Certainly, none of the sections revealed gross cellular changes, marked gliosis or architectonic distortions that could be specifically attributed to the pathologic effects of electroshock (cf. plates). Consequently, the most likely inferences to be derived from the anatomical portions of our study were that the histologic and microscopic techniques employed were less adequate as an index of the molecular changes in brain structure or function produced by neurosis or electroshock than were the actual deviations in total behavior observed in the living animal.

#### "Therapeutic" Factors in Electroshock.

Our observations indicated, therefore, that cerebral electroshock can modify behavior (a) by disintegrating both the mnemonic and reactive factors in complex "neurotic" patterns such as inhibitions, phobias, and compulsions while leaving the simpler, goal-directed responses relatively intact, (b) by forcing behavior into new channels of adaptation, and (c) by making possible the re-establishment of latent and more "normal" patterns. In the latter instance various methods of ancillary therapy could then be employed, *e. g.*, increasing normal motivations, exerting environmental pressures to force the animal toward a solution of residual conflicts, guidance by the experimenter into re-exploratory behavior and, finally, active working-through of the problems on the part of the animal.<sup>6</sup> However, part of the price of recovery was a variable loss of certain higher adaptive capacities; *e. g.*, even at the end of their post-shock testing period, four of the animals in this study had not re-acquired their normal facility and efficiency in complex skills of which they had formerly been capable.

#### DISCUSSION

Previous experiments have shown that convulsions produced in various animals by electroshock, by insulin hypoglycemia, or by the injection of metrazol disorganized

complex adaptive patterns such as maze-running (17, 34, 4) or the extinction of conditioned responses (31, 30, 13, 6). These effects have been attributed to temporary or permanent impairment of cortical functions either directly by anoxia (11) or by anoxia subsequent to depression of cerebral metabolism (40).

*Anatomic Effects.*—Definite histopathologic changes in the brains of animals subjected to electroshock have been reported in a number of studies,<sup>7</sup> but in some of these the currents used were excessively intense or prolonged; also, the effects noted may have been due to vascular disturbances arising from medullary (1) and diencephalic stimulation, or to mechanical injury of the brain during the convulsions. It is significant, therefore, that while acute ganglion-cell effects (11) and alterations in tissue permeability and conductance (33) were produced and exacerbated in the human brain by successive electroshocks, controlled post-mortem studies on experimental animals (1, 7, 16, 37) have revealed few or no permanent pathologic changes detectable by standard techniques.

*Clinical Parallels.*—Tests of human behavior after artificially induced convulsions yield results comparable to those obtained in animal experimentation in these respects: mental efficiency batteries following metrazol convulsions (38), and Rorschach records, handwriting and gestalt figure-drawings obtained after electroshock (18) show a severe impairment of performance immediately after shock followed by a gradual reorganization of function; nevertheless, various amnesic defects persist after the end of the treatment (35, 42). While the greater accessibility of patients after a course of shock combined with psycho-therapy may result in "improved" scores on general tests of intelligence, it seems probable that more highly specialized and sensitive tests will disclose subtle impairment of higher perceptive and integrative functions (category behavior) similar to those that result

<sup>6</sup> For a detailed discussion of these methods see reference (19).

<sup>7</sup> McMahon (27) on guinea pigs; Langworthy (15) on rats; Heilbrunn and Weil (12) in rabbits; Alpers and Hughes (2), Morrison and Weeks and Cobb (28) in cats; Neuberger et al. (29) in dogs.

from known organic lesions of the brain (8, 10, 14).

### SUMMARY

Six cats were made experimentally neurotic and were then subjected to cerebral electroshocks comparable to those used in clinical therapy. All of these animals showed a marked disintegration of inhibitions, phobias, compulsions and other neurotic patterns, with emergence of simpler, more normally readaptive behavior which could be further improved by guidance, retraining, and other corrective procedures. However, all of the neurotic animals and two normal controls subjected to the electroshocks also showed an impaired capacity for complex adaptations, with subsequent recovery in only 2 of the animals. In no case, however, could these deficits be correlated with corresponding histopathologic changes in the brain. The significance of these observations in relation to the clinical use of shock therapy is briefly discussed.

### BIBLIOGRAPHY

1. Alexander, L., and Lowenbach, H. Experimental studies on electroshock treatment: The intracerebral vascular reactions as an indicator of the path of the current and the threshold of early changes within the brain tissue. *J. Neuropath.*, **3**: 139, 1944.
2. Alpers, B. J., and Hughes, J. Changes in the brain after electrically induced convulsions in cats. *Arch. Neurol. Psychiat.*, **47**: 389, 1942.
3. Alpers, B. J., and Hughes, J. The brain changes in electrically induced convulsions in humans. *J. Neuropath. and Exper. Neurol.*, **1**: 173, 1942.
4. Duncan, C. P. The effect of electroshock convulsion on the maze habit in the white rat. *J. Exp. Psychol.*, **35**: 267, 1946.
5. Gellhorn, E., and Kessler, M. Interaction of electric shock and insulin hypoglycemia. *Arch. Neurol. Psychiat.*, **49**: 808, 1943.
6. Gellhorn, E., and Mintoya, H. The effect of insulin hypoglycemia on conditioned reflexes. *J. Neurophysiol.*, **6**: 161, 1943.
7. Globus, J. H., Harriveld, A. von, and Wiersma, C.A.C. Influences of electric current application on the structure of the brain of dogs. *J. Neuropath.*, **2**: 263, 1943.
8. Goldstein, K. After effects of brain injuries in war. New York: Green and Stratton, 1942.
9. Haggard, H. W., and Jellinek, E. M. Alcohol explored. New York: Doubleday, Doran, 1942.
10. Halstead, W. C., and Settlage, P. H. Grouping behavior of normal persons with lesions of the brain. *Arch. Neurol. Psychiat.*, **49**: 489, 1943.
11. Heilbrunn, G., and Liebert, E. Biopsy studies of the brain following artificially produced convulsions. *Arch. Neurol. Psychiat.*, **46**: 548, 1941.
12. Heilbrunn, G., and Weil, A. Pathologic changes in the central nervous system in experimental electric shock. *Arch. Neurol. Psychiat.*, **47**: 918, 1942.
13. Kessler, M., and Gellhorn, E. Effect of electrically and chemically induced convulsions on conditioned reflexes. *Am. J. Psychiat.*, **99**: 687, 1943.
14. Klebanoff, S. G. Psychological changes in organic brain lesions and ablations. *Psych. Bull.*, **42**: 585, 1945.
15. Langworthy, O. R. Abnormalities produced in the central nervous system by electrical injuries. *J. Exper. Med.*, **51**: 943, 1930.
16. Lidbeck, W. L. Pathologic changes in the brain after electroshock. *J. Neuropath.*, **3**: 81, 1944.
17. Loken, R. D. Metrazol and maze behavior. *J. Comp. Psychol.*, **32**: 11, 1941.
18. Lowenbach, H., and Stainbrook, E. J. Observations on mental patients after electroshock. *Am. J. Psychiat.*, **98**: 828, 1941.
19. Masserman, J. H. Behavior and neurosis. Chicago, University of Chicago Press, 1943.
20. Masserman, J. H. Principles of dynamic psychiatry. Philadelphia, W. B. Saunders & Co., 1946.
21. Masserman, J. H., Beal, J., and Sanders, Rosaltha. Stimulant effects of ethyl alcohol on cortico-hypothalamic functions. *J. Pharmacol.*, **70**: 450, 1940.
22. Masserman, J. H., and Jacobson, L. Effects of ethyl alcohol on the cerebral cortex and hypothalamus of the cat. *Arch. Neurol. Psychiat.*, **43**: 334, 1940.
23. Masserman, J. H., and Jacques, Mary G. Alcohol as a preventive of experimental neuroses. *Quart. J. Stud. Alc.*, **6**: 281, 1945.
24. Masserman, J. H., and Siever, P. Dominance, neuroses, and aggression. Motion picture film, B & W 16 mm. 700 ft. Psychological Cinema Register, State College, Pa.
25. Masserman, J. H., and Yum, K. S. Neuroses and Alcohol. *Amer. J. Psychiat.*, **101**: 389, 1944. Also Motion picture film, B & W, 16 mm., 700 ft. Psychological Cinema Register, State College, Pa.
26. Masserman, J. H., and Yum, K. S. Analysis of the effects of alcohol on experimental neuroses. *Psychosom. Med.*, **8**: 36, 1946.
27. MacMahon, H. E. Electric shock. *Am. J. Pathol.*, **5**: 333, 1929.
28. Morrison, L. R., Weeks, A., and Cobb, S. Histopathology of different types of electric shock on mammalian brains. *J. Indust. Hyg.*, **12**: 324, 1930.
29. Neubereger, K. I., Whitehead, R. W., Rutledge, E. K., and Ebaugh, F. G. Pathologic changes in the brains of dogs given repeated electrical shocks. *Am. J. Med. Sc.*, **204**: 381, 1942.
30. Rose, J. A., Tainton-Pottberg, A., and Anderson, D. D. Effects of insulin shock on behavior and conditioned reflex action in the well trained sheep. *Proc. Soc. Exper. Biol.*, **N. Y.**, **38**: 653, 1938.
31. Rosen, V. H., and Gantt, W. H. The effect

[Aug.

studies  
convul-  
1941.pathologic  
experi-  
psychiat.,of elec-  
on con-  
7, 1943.  
anges in  
Bull.,roduced  
injuries.in the  
31, 1944.  
behavior.J. Ob-  
roshock.neurosis.  
3.mic psy-  
o., 1946.  
Sanders,  
cohol on  
70:450.Effects  
d hypo-  
iat., 43:Mary G.  
neuroses.minance,  
lm, B &  
Register,Neuroses  
9, 1944.  
700 ft.,  
ege, Pa.  
Analysis  
neuroses.

Am. J.

Cobb, S.  
ic shock  
12:324.V., Rut-  
changes  
electricalAnder-  
vior and  
d sheep.  
938.

ne effect

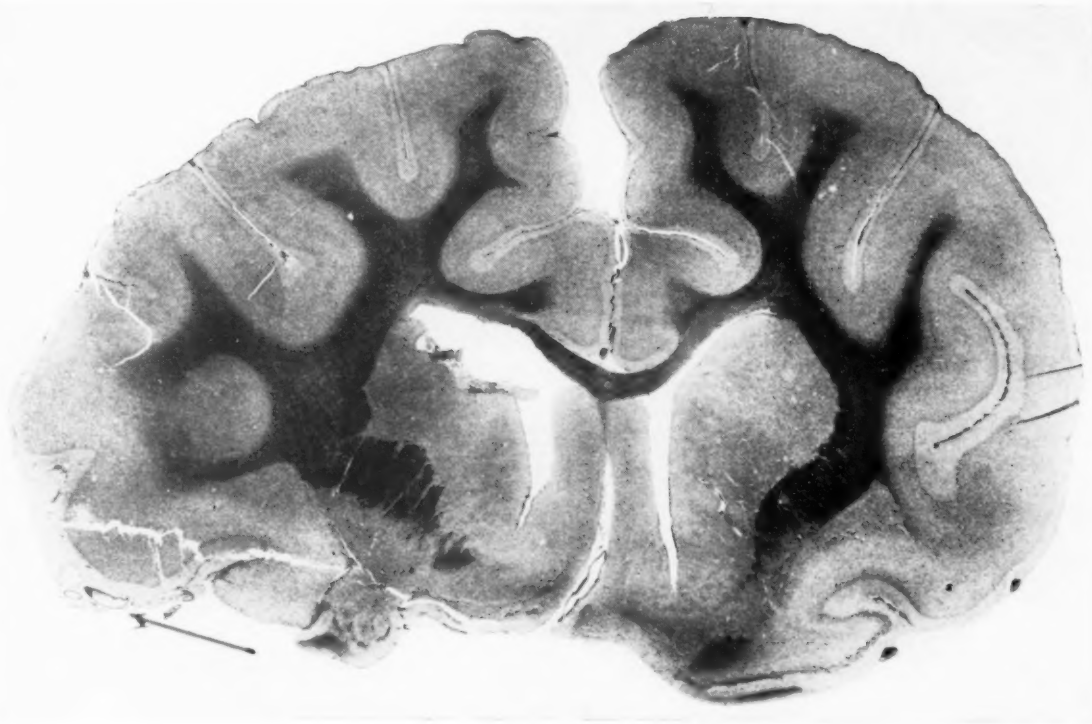


FIG. 2 A.

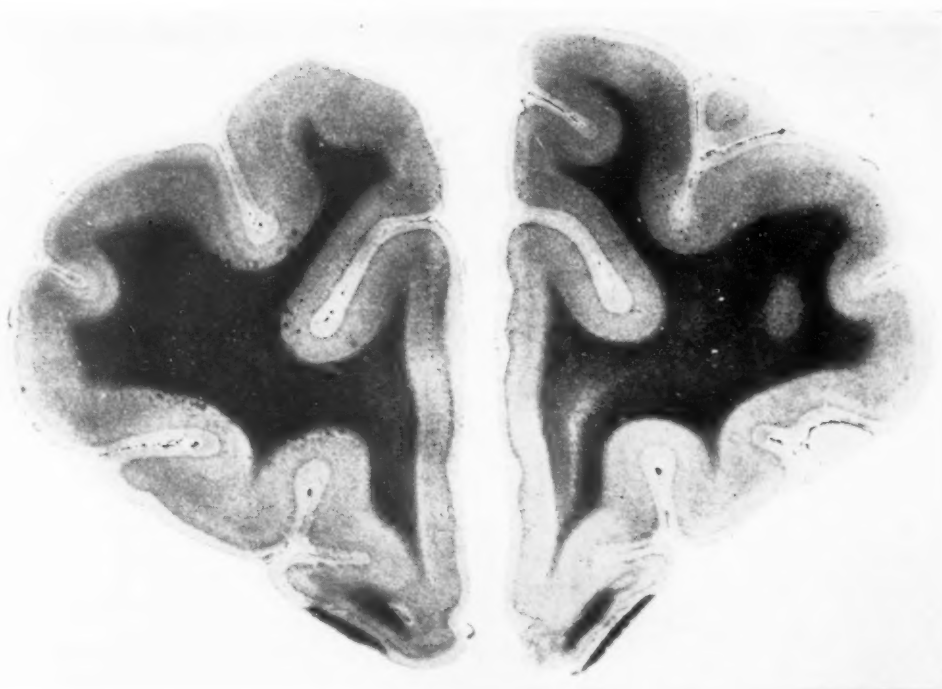


FIG. 2 B.

FIG. 2.—Sample sections from the brains of cats subjected to cerebral electroshock. (a) Cat 4, sagittal section through third ventricle, H. and E. stain; arrow points to pathologic changes summarized in text. (b) Cat 6, H. and E. stain, level of coronal sulcus. (c) Cat 7, H. and E. stain, level of hypothalamus. (d) Cat 8, Nissl stain, level of commissure.

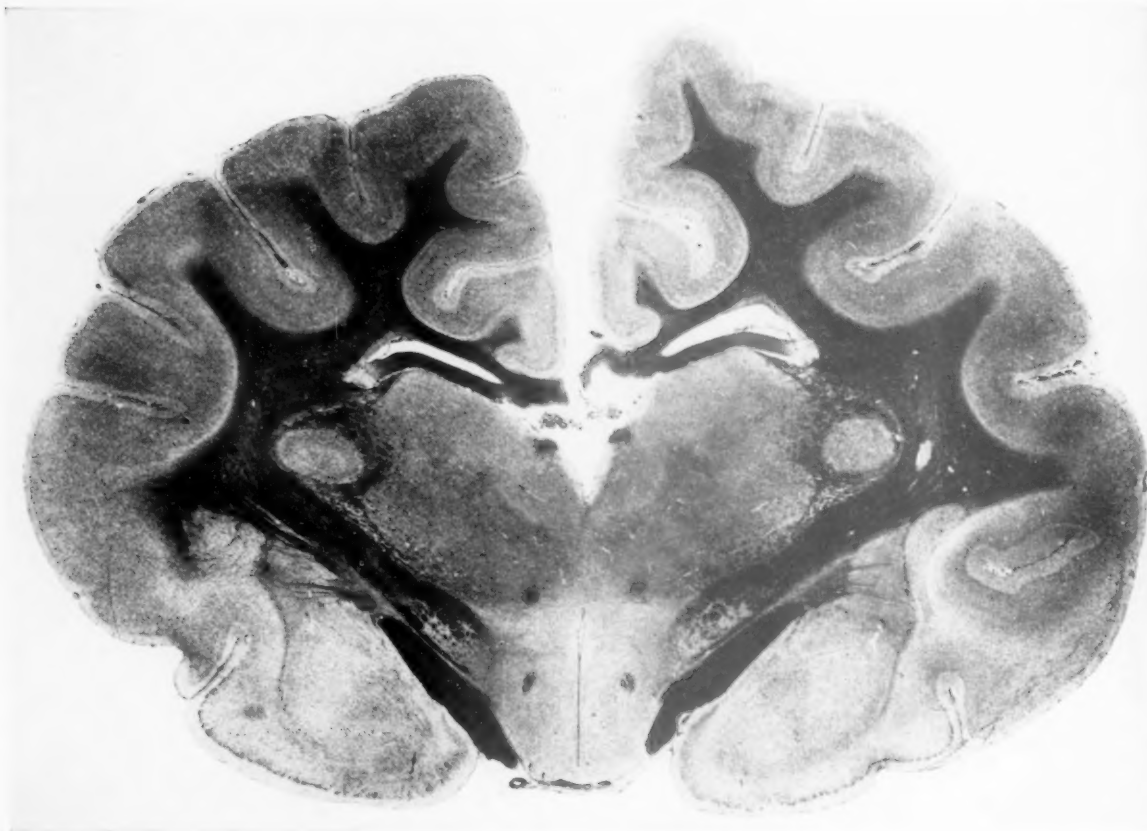


FIG. 2 C.

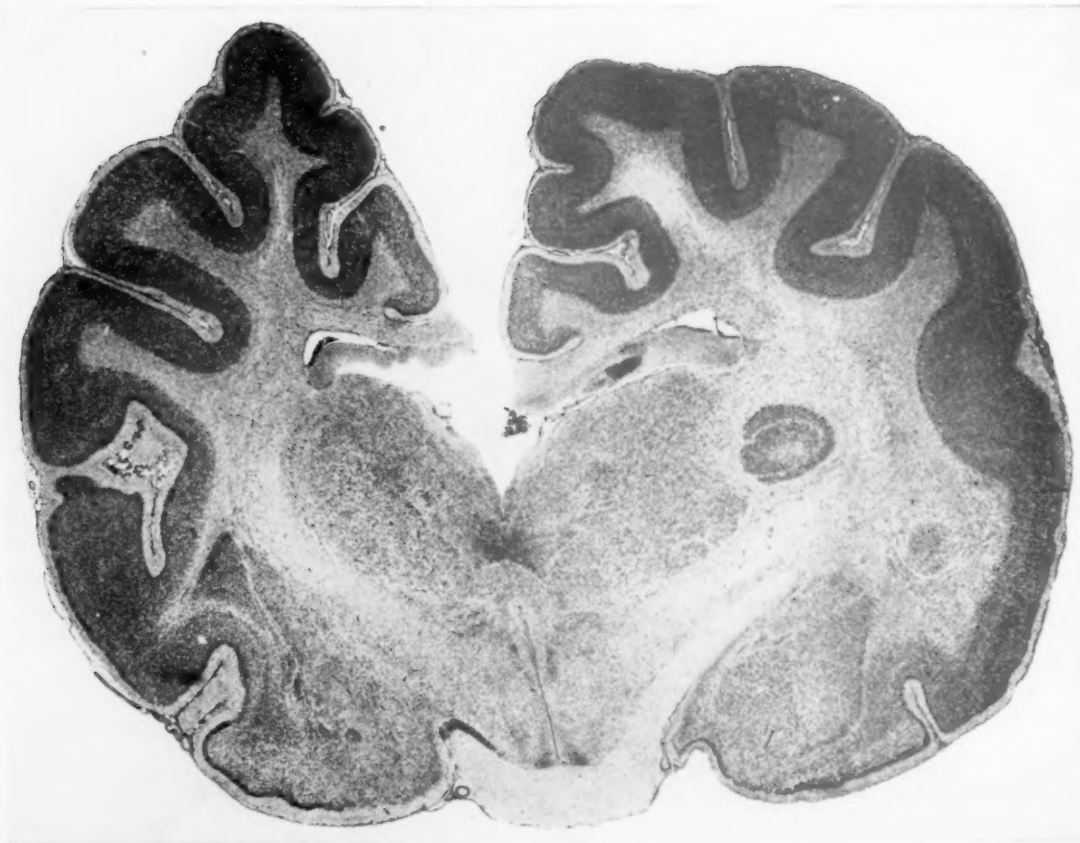


FIG. 2 D.

1947

of met  
ing in  
1:74,  
32.  
The e  
J. Psy  
33.  
G. Pl  
panyin  
Trans  
174, I  
34-  
electr  
1943.  
35-  
of m  
237:  
36.  
morph  
menta  
50:4

of metrazol convulsions on conditioned reflex training in dogs. *Proc. Amer. Physiol. Soc. Boston*, **1**:74, 1942.

32. Sherman, I., Mergener, J., and Levitin, D. The effect of convulsive treatment on memory. *Am. J. Psychiat.*, **98**:401, 1941.

33. Spiegel, E., Spiegel-Adolf, M., and Henny, G. Physical-chemical changes in the brain accompanying electrically induced convulsive discharges. *Trans. Am. Neurol. Assoc.*, 68th Meeting, Chicago, **174**, 1942.

34. Stainbrook, F. Maze behavior of the rat after electroshock convulsions. *J. Exp. Psychol.*, **33**:247, 1943.

35. Tooth, G. and Blackburn, J. M. Disturbances of memory after convulsion treatment. *Lancet*, **237**:17, 1939.

36. Wikler, A., and Masserman, J. H. Effects of morphine on learned adaptive behavior and experimental neuroses in cats. *Arch. Neurol. & Psychiat.*, **50**:401, 1943; also, Motion Picture Film, B & W,

16 mm., 500 ft., Psychological Cinema Register, State College, Pa.

37. Winkelman, N. W., and Moore, M. T. Neurohistologic finding in experimental electric shock treatment. *J. Neuropath.*, **3**:199, 1944.

38. Wittman, Phyllis, H. A psychological study of the mental confusion following metrazol therapy. *Elgin Papers*, **3**:67, 1939.

39. Wittman, Phyllis H., and Russell, J. T. Mental efficiency levels before and after shock therapy. *Elgin Papers*, **4**:70, 1941.

40. Wortis, S. B., Shaskan, P., Impastato, P., and Almansi, R. Brain metabolism. VIII. The effects of electric shock and some newer drugs. *Am. J. Psychiat.*, **98**:354, 1941.

41. Ziskind, Gengerelli, and Loken, R. D. Effect of metrazol on recent learning. *Proc. Soc. for Exp. Biol. and Med.*, **43**:64, 1940.

42. Zubin, J. and Barrera, S. E. Effect of electric convulsion therapy on memory. *Proc. Soc. Biol. and Med.*, **48**:596, 1941.

## ELECTROSHOCK THERAPY

### A REVIEW OF OVER 23,000 TREATMENTS USING UNIDIRECTIONAL CURRENTS<sup>1</sup>

PAUL H. WILCOX, M.D., TRAVERSE CITY, MICH.

The application of important physiological principles will soon bring about major changes in the currently accepted methods of electroshock therapy. Each change necessitates the re-evaluation of numerous factors. The use of minimal electroshock convulsive stimuli, employing relatively low intensity unidirectional currents, initiated by Friedman, Reiter, and the author(1) in 1940, has made possible a wider application of this therapy than the usual Cerletti-Bini technique has warranted. The introduction of electrical pulses of less than one millisecond duration will permit a further reduction in the electrical energy required(2).

This report presents a few aspects of what has been accomplished with the use of modified half-wave rectified 60-cycle current<sup>2</sup> at Traverse City State Hospital during the past 5 years. There and elsewhere therapeutic results, superior to those obtained by the more commonly used Cerletti-Bini technique, have been obtained with much less evidence of even temporary functional impairment of the brain beyond the immediate reorientation period of from 20 to 60 minutes following the convulsion. We have not needed to soften our convulsions with curare because the technique produces a smoother, less violent convulsion.<sup>3</sup> We have been able to carry out

psychotherapy concurrently with the treatments because the patient does not become disoriented or confused and his memory remains clear as far as the effects of the treatments are concerned. We have been able to continue the treatments in long courses in resistant cases with less fear of brain damage than with the Cerletti-Bini method. Up to May 1, 1946, 2,050 patients had been treated with electroshock therapy, and a total of 28,191 electroshock treatments had been given at Traverse City State Hospital.

The statistical principle which I have introduced is to review each patient at stated intervals after the start of his shock therapy. This method makes the review date vary but standardizes the period reviewed in respect to each patient. For the chronic patient only ward improvement is expected but for early cases a high standard of social remission (rehabilitation) is the basis of evaluating the results of therapy.

#### THE FIVE HUNDRED MOST CHRONIC PATIENTS

It is generally accepted that the duration of the illness before the start of shock therapy is of primary importance in prognosis,

The age range of this group was 18 to 63 and the range of treatments 64 to 194 per patient. The span of time over which the treatments were given ranged from 5 mos. to 4 yrs., 3 mos. The total number of treatments for all 14 patients was 1,412. One patient was a severe diabetic. Two showed minimal hypertrophic spur formation. One has carried a systolic B.P. of around 240 throughout. One showed considerable osteoporosis of the spine.

X-rays of the dorsal and lumbar spines failed to reveal any compression or wedging in a single one of the 14 cases. This result was better than we dared expect, and our only explanation is that we do not have any or at least not more than a few silent vertebral fractures. We have been quite conscientious about X-raying the spines of all patients who complain of back discomfort lasting more than a few hours. The fact that our patients are not dulled by our treatments may explain why back symptoms are not overlooked. Of the small number who do complain of back symptoms, only a few have had vertebral compressions.

<sup>1</sup> Read at the 102nd annual meeting of The American Psychiatric Association, Chicago, Ill., May 27-30, 1946. Manuscript revised Jan. 1947.

From the Traverse City State Hospital, Traverse City, Mich.

<sup>2</sup> The Reiter Electrostimulator, manufactured by Reuben Reiter, D. Sc., 1366 York Ave., New York 21, New York.

<sup>3</sup> There have occurred a few vertebral compressions and skeletal complications in our series. Curare may still be indicated in some very exceptional cases, but we have considered it in only 2 cases in more than 5 years' experience. In January 1947, we put our claims to the most rigid test possible. We selected 14 cases.

Each of these (1) had had over 50 electroshock convulsions given on the author's service, (2) had never had shock therapy of any kind elsewhere, (3) was still on the author's service, and (4) had never had an X-ray of the spine before.

and all workers testify that chronic cases are resistant to cure. However, as a conservative estimate, 40% of our most chronic patients have shown significant improvement in ward behavior when adequately treated with electroshock.

The 500 most chronic patients who have received electroshock therapy have been reviewed in detail. These men and women were admitted to Traverse City State Hospital during a period of over 43 years, and none was started on electroshock less than 3 years after admission. The treatments were given by 13 different doctors without any uniform plan of selection of the patients. Many were selected for treatment because they were extremely difficult ward problems.

Improvement in ward behavior meant significant decrease in wetting, soiling, destructiveness and noisiness, and improvement in cleanliness, eating habits, general cooperation, work adjustment, and sociability. The basis of comparison was the patient's previous ward behavior. No attempt was made to judge basic improvement in the psychosis other than in the ward behavior. Only a small number of these chronic patients improved enough to leave the hospital, even with the help of treatments.

A detailed analysis of the 500 most chronic patients under discussion has been made, but space does not permit the publication of these tables and graphs in full. There were 36 different diagnoses included: 6% were classified as manic-depressive-manic; 9% dementia præcox, type unspecified; 22% dementia præcox, hebephrenic; 17% dementia præcox, catatonic; 18% dementia præcox, paranoid; 6% mental deficiency with psychosis; and 22% miscellaneous (30 different diagnoses) (Table 1 #).<sup>4</sup>

The distribution of the age at the start of treatment of the 500 most chronic patients reveals a median age for the women of 47 years and for the men, 42 years; but the improved group had very nearly the same age distribution as the unimproved group (Tables 2A # and 2B #).

Among the 500 were 145 chronic patients who had been treated previously with other

shock therapy but had responded inadequately. Possibly the previous treatments kept them somewhat more responsive to treatment than the previously untreated patients. Four months after the start of electroshock therapy 41% of these 145 patients showed ward improvement. The figure for the whole 500 was 33%. The standard errors of the respective percents were 4.1% and 2.1%, and the critical ratio of the difference of the percents was 1.7, which is fairly significant<sup>5</sup> (Tables 3 # and 4 #).

The most consistent correlation with improvement rate was the number of treatments administered. Improvement in evidence 4 months after the start of treatment was usually not maintained unless additional treatments were given. This brings out a significant point. These patients are suffering from a chronic ailment with a strong tendency to relapse into their previous inadequate state. The best we can offer them at present is a maintenance treatment.

<sup>5</sup> The standard error of a percent was calculated as suggested in a personal communication from Dr. H. H. Dedichen (5), Oslo, Norway, as follows:

$$\text{Standard error } (\sigma) = \sqrt{\frac{h(1-h)}{n-1}} = \sqrt{\frac{\frac{r}{n} \left( \frac{1-r}{n} \right)}{n-1}}$$

Where  $r$  = number improved,  $n$  = number of cases, and  $h = \frac{r}{n}$ . This answer would be in decimals so should be multiplied by 100 to read in percents. Furthermore, the standard error of the difference between two percentages would be calculated as follows:

Standard error of the difference ( $\sigma_{diff}$ ) =  $\sqrt{\sigma_1^2 + \sigma_2^2}$  where  $\sigma_1$  and  $\sigma_2$  are the standard errors of the respective percents.

The statistical significance of the difference between two percents would be the actual difference divided by the standard error of the difference, giving a critical ratio. A table of the chance probabilities of such ratios can be found in the Handbook of Chemistry and Physics (7). For example, a ratio of 1 would mean that the odds are only about 2 to 1 that the difference was not purely chance. A ratio of 2 would mean that the odds were about 21 to 1 that the difference was not purely chance. For a ratio of 3 the odds would be about 369 to 1 against chance. Furthermore, when the total number of cases is less than 30 the critical ratio of the difference does not indicate the full chance factor. Supplementary discussion of these formulas can be found in Lindquist (8).

<sup>4</sup> The tables and figures marked with this sign # have been omitted for lack of space but will be supplied by the author on request.

Danziger and Kindwall(3) have indicated a method of estimating the adequacy of treatment; namely, find the cumulative number of treatments required for half of those who improved and double that figure. Thus, 33% of the 500 chronic patients showed ward improvement at the review 4 months after the start of treatment. Referring to Fig. 1, it is evident that 16.5% of the cases showed improvement with approximately 4 treatments. This would give the figure of 8 treatments as the minimum adequate trial of therapy at the 4-month review. If those who were unimproved and who were given 10 treatments or less are excluded from the

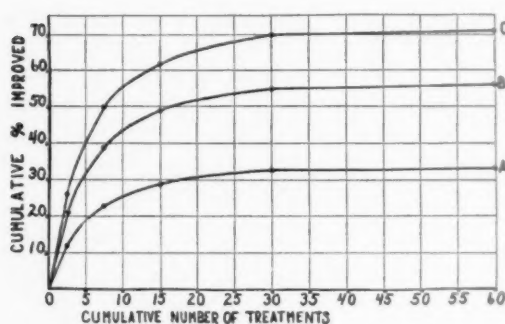


FIG. 1.—Cumulative ward improvement rates, chronic men and women combined, 4-month review. A. All 500 cases. B. Excluding unimproved cases treated with 5 or less treatments, leaving 296 cases. C. Excluding unimproved cases treated with 10 or less treatments, leaving 235 cases. See Table 5 #.

group as not having been given an adequate trial of treatment, a figure of 71% improved is obtained which is undoubtedly too high. A compromise calculation is to exclude those who were unimproved but had only 5 or less treatments. There can be little argument against the claim that such patients were not given adequate trial of therapy. This gives a figure of 56% improved, which still seems too high and probably means the clinical judgment was adequate to foresee the unfavorable outcome even with less than 5 treatments (Table 5 #).

At the 4-month review the median number of treatments per patient was about twice as high for the women as for the men, yielding 38% ward improvement for the women and 30% for the men with a critical ratio of the difference of 1.9, which is fairly significant (Table 5 # and Fig. 2 #).

The improvement rate drops off at subsequent review periods. The chronic men were treated less persistently than the women. At the 24-month review period, excluding the unimproved cases who had 5 or less treatments, there is an improvement rate of 40% for the women and 27% for the men. If the unimproved cases who had 10 or less treatments are excluded, the improvement rate becomes 44% for the women and 41% for the men (Figs. 3 # and 4 #).

A detailed study of the ward improvement rates at the 4-month review according to the diagnosis and according to the number of treatments was made for the women (Table 6 #). These findings have been grouped in Table 7 and Fig. 5 showing that the diagnoses manic-depressive, manic, dementia præcox, type unspecified, and mental deficiency with psychosis showed a better response than the hebephrenics, catatonics, and paranoids. The two groups were given nearly the same number of treatments per patient, on the average. Examination of the records reveals that the cases of dementia præcox, type unspecified, were so diagnosed before the classification was up to present standards of differentiation and included less well-defined cases than those now specified as hebephrenics, catatonic, and paranoid.

Table 7 also shows the corrected figures when the unimproved chronic women with 5 or less treatments are excluded from the diagnostic groups. This brings the ward improvement rate for chronic hebephrenics, catatonics, and paranoids above 40%. There is considerable difference of opinion as to what to consider improvement in these chronic patients, but a maintenance program of at least 20 treatments per year will maintain a significant degree of ward improvement in at least 40% of these most chronic patients. The use of minimal currents makes such a program possible without causing cumulative brain damage in the patients.

#### THE 541 FIRST ADMISSIONS TREATED WITH ELECTROSHOCK ONLY, AND WITHIN 4 MONTHS AFTER ADMISSION

For recent admissions and readmissions we have followed a policy of giving nearly all patients aged 60 or under a trial of treatments unless they show prompt signs of

TABLE 7

CUMULATIVE WARD IMPROVEMENT RATE AT 4-MONTH REVIEW, RELATED TO NUMBER OF TREATMENTS;  
CONTRASTING GROUPS OF DIAGNOSES, CHRONIC WOMEN

	Cumulative number of treatments up to date of review				
	1-5	1-10	1-20	1-40	Total
<i>Group A—58 cases</i>					
Manic-depressive-manic.					
Dementia præcox—type unspecified.					
Mental deficiency with psychosis					
Cumulative No. of cases.....	25	42	51	58	58
Cumulative No. imp.....	9	21	26	29	29
Cumulative % imp.....	16%	36%	45%	50%	50%
See Fig. 5, Curve A					
Standard error of the %.....	4.9	6.4	6.6	6.6	6.6
<i>Group B—126 cases</i>					
Dementia præcox, hebephrenic.					
Dementia præcox, catatonic.					
Dementia præcox, paranoid					
Cumulative No. of cases.....	57	76	106	122	126
Cumulative No. imp.....	12	22	31	38	40
Cumulative % imp.....	10%	17%	25%	30%	32%
See Fig. 5, Curve B					
Standard error of the %.....	2.7	3.4	3.9	4.1	4.1
Difference, Group A minus Group B.....	6%	19%	20%	20%	18%
Standard error of the difference.....	5.6	7.2	7.7	7.8	7.8
Critical ratio .....	$\frac{A-B}{\sigma_{diff}}$	1.1	2.6	2.6	2.3
<i>Group A—42 cases</i>					
Excluding the 16 unimproved cases with 1-5 treatments, leaving 42 cases.					
Cumulative No. of cases.....	9	26	35	42	42
Cumulative No. imp.....	9	21	26	29	29
Cumulative % imp.....	21%	50%	62%	69%	69%
Standard error of the %.....	6.3	7.8	7.6	7.2	7.2
<i>Group B—81 cases</i>					
Excluding the 45 unimproved cases with 1-5 treatments, leaving 81 cases.					
Cumulative No. of cases.....	12	31	61	77	81
Cumulative No. imp.....	12	22	31	38	40
Cumulative % imp.....	15%	27%	38%	47%	49%
Standard error of the %.....	4.0	5.0	5.4	5.6	5.6

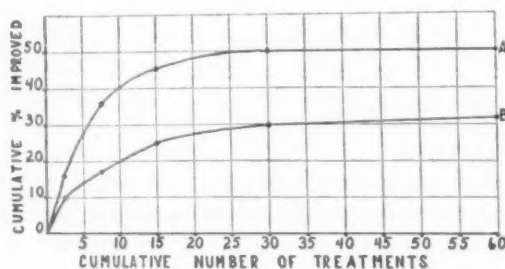


FIG. 5.—Cumulative ward improvement rates of chronic women at 4-month review, comparing diagnostic groups. A. Manic-depressive, manic, dementia præcox—type unspecified, and mental deficiency with psychosis—58 cases. B. Dementia præcox, hebephrenic, catatonic, and paranoid—126 cases. See Table 7.

spontaneous improvement, or unless there are specific contraindications. The prognosis is often impaired if treatment is delayed until the symptoms become stereotyped.

Over 60% of all first admissions aged 60 or under who were treated early and adequately were rehabilitated by the end of 1 year; *i.e.*, they made a satisfactory social readjustment and were home or independent. By the end of the second year 65% were rehabilitated if adequately treated.<sup>6</sup> Psycho-

<sup>6</sup> The phrase "if adequately treated" is an important consideration. Danziger and Kindwall indicate a mathematical method of evaluating what can be considered "adequate." In this paper the writer

therapy was also utilized when the patients were accessible, and an active employment program was followed whenever possible. The standard of rehabilitation used is rather high, and patients who were doing well at the 12-month and 24-month review periods were still not credited with rehabilitation if they had had a relapse during the preceding 6 months. Any evidence from letters or social reports that a patient was not doing satisfactorily excluded the patient from the rehabilitated group. This is comparable with the term "social remission" as used by some authors as there was no opportunity to examine the rehabilitated cases psychiatrically to determine the fine points of full recovery.

The author's technique brings about the improvement in the patients without an intermediate period of superimposed confusion and memory loss after the reorientation phase of the convulsion. This pattern of response is explained on the basis of brain facilitation (see Wilcox(4)).

These first admissions have been reviewed at 4 months (541 cases), 12 months (369 cases), and 24 months (341 cases) after the start of treatment for each patient. The median age at the start of treatment was 37 years for both the men and women, and the improved cases had the same median age as the others. This group of 541 cases was

attempted to apply their criteria very conservatively and then selected a group of 126 women who in general were adequately treated in order to see to what extent the mathematical predications could be substantiated. It must be readily admitted that many patients in this hospital did not receive an adequate trial of therapy. Insofar as it might be that they would have responded if they had received an adequate trial of treatment, it is not fair to the technique to retain them in the figures evaluating the results of the technique.

As will be seen in Table 14 the test series of women showed 63% ( $\pm 4.3\%$ ) rehabilitated at the 12-month review and 65% ( $\pm 4.3\%$ ) at the 24-month review. That difference is not statistically significant but most subgroups show a net gain at the 24-month review. Actually, for the whole group 7 (6%) lost the status of rehabilitation between the 12-month and the 24-month reviews, but another 10 (8%) gained that status during that period. As indicated in the text, rehabilitation is not considered as such unless that degree of adjustment has been maintained for at least 6 months continuously before the 12-month or the 24-month reviews, respectively. There may be an occasional patient classified as rehabilitated at both reviews who has suffered a brief relapse shortly after the 12-month review.

analyzed as to rehabilitation rates and number of treatments at the respective review periods (Table 8#). The women quite consistently were given more treatments than the men. This is known to be partly influenced by the doctors on the respective services, but it is fair to ask whether the women may require more treatments on the average. Our available information cannot answer this question satisfactorily. Forty-five percent of these 541 first admissions were classified as rehabilitated at the 4-month review (Fig. 6#). It should be noted that the standard for rehabilitation at the 4-month review is not quite the same as for the later reviews, because later we require a duration of rehabilitation of at least 6 months continuously up to the time of review. Obviously that is impossible for the 4-month review.

The men showed 58% ( $\pm 3.5\%$ ) rehabilitated at the 12- and 24-month reviews, whereas the women showed 58% ( $\pm 3.8\%$ ) and 63% ( $\pm 3.9\%$ ), respectively (Figs. 7# and 8#). These standard errors of the percents are large enough to make the significance of the differences doubtful.

The rehabilitation figures for these first admissions have been adjusted by excluding certain unrehabilitated cases as not having had "an adequate trial of treatment" (Table 8#). This procedure can be determined only by examining the individuals thus excluded and by instituting a more "adequate" treatment program to see whether the percentages actually are thus increased. When the 178 hebephrenic, catatonic, and paranoid præcoxes are taken together, the percent rehabilitated at the 4-month review was 30% ( $\pm 3.4\%$ ). When the unrehabilitated cases who had only 1 to 10 treatments are excluded, an adjusted rate for those rehabilitated of 41% ( $\pm 4.3\%$ ) is obtained (Table 9# and Fig. 9#). By actual clinical test in the 41 selected women hebephrenic, catatonic, and paranoid præcoxes analyzed in Table 12, the result of "adequate" treatment yielded 34% ( $\pm 5.9\%$ ) rehabilitated at the 4-month review.

Table 10# shows the classification of the 541 first admissions as to diagnosis, 54 diagnoses being represented. Table 11 arranges the diagnoses into 5 groups. The patients

with  
thera  
rehab  
30%  
and  
for  
grou  
roses  
toxic  
cent  
chos  
the i

A. H  
B. I  
C. P  
D. A  
E. C

is d  
tion  
mar  
T  
whi  
clas  
sub  
par  
apy  
clas  
par  
cho  
of  
trol  
cho  
Gro  
wit  
tho  
phr  
fac  
ma

within each group responded to electroshock therapy with some similarity as shown in the rehabilitation rates at the 4-month review, 30% ( $\pm 3.5\%$ ) for hebephrenic, catatonic, and paranoid præcox group; 59% ( $\pm 5.5\%$ ) for the involutional and manic-depressive group; 72% ( $\pm 6.2\%$ ) for the psychoneuroses; 65% ( $\pm 4.3\%$ ) for the alcoholic, toxic, etc., group; and 21% ( $\pm 4.1\%$ ) for the central nervous system syphilis, old age psychosis, etc., group. The rehabilitation rate in the involutional and manic-depressive group

The author has not attempted to reclassify strictly his patients in this way, but actually Group A comes very close to Dedichen's Group I, but Group B contains cases which would be in Dedichen's Group II. Group D also contains a number of the Dedichen Group II cases.

The electroshock treatment program on the women's service has been intensive and fairly consistent since January 1, 1943. We selected for special study a group of 126 women who (1) started on electroshock

TABLE 11

THE 541 FIRST ADMISSIONS TREATED WITH ELECTROSHOCK ONLY, AND WITHIN 4 MONTHS AFTER ADMISSION; REHABILITATION RATES ACCORDING TO DIAGNOSTIC GROUPS AT THE 4-MONTH REVIEW

	No. of cases	Men and women		Standard error of the %
		No. rehabilitated	% rehabilitated	
A. Hebephrenic, catatonic, and paranoid præcoxes....	178	53	30	3.5
B. Involutional psychoses and manic-depressives.....	81	48	59	5.5
C. Psychoneuroses .....	53	38	72	6.2
D. Alcoholics, toxics, atypical præcoxes, undiagnosed psychoses, and non-psychotic conditions.....	121	79	65	4.3
E. Central nervous system syphilis, old age psychoses, psychopathic personalities, mental deficiencies, and miscellaneous organic psychoses.....	108	23	21	4.1
Total .....	541	241	45	2.1

is decreased by the presence of the involutional paranoids and the manic-depressive manics.

The dementia præcox—"other types" which include patients who are difficult to classify as definitely one or another of the subclasses, namely, hebephrenic, catatonic, or paranoid, respond better to electroshock therapy than those who can be more definitely classified. This can also be stated for the paranoid conditions and undiagnosed psychoses. Dedichen(5) in his excellent study of metrazol-treated cases compared to a control series of untreated cases in Norway chose to classify his patients into syndromes. Group I were the dementia præcox mixtures without affective admixtures. Group II were those with various admixtures of schizophrenic and manic-depressive or confusional factors. Group III were the relatively pure manic-depressive cases.

within 4 months after present admission; (2) had no other type of shock therapy at any time; (3) started on electroshock between January 1, 1943 and April 1, 1944, thus giving a 2-year review after the start of treatment; (4) were not direct transfers from other hospitals.

These women included the second or more admissions as well as the first admissions. Table 12 shows the diagnostic distribution, including 33 diagnoses, and the classification as to attack and duration of attack in relation to rehabilitation at the respective review periods. Unfortunately, this breaks down the statistics into very small units, each of which becomes unreliable statistically. However, most of the trends shown are consistent and thus gain significance as the cases are grouped into larger groups as seen later in Table 14. In most groups there is some increase in the number rehabilitated at the

TABLE 12

THE 126 WOMEN RECENT ADMISSIONS TREATED WITH ELECTROSHOCK ONLY, AND WITHIN 4 MONTHS AFTER ADMISSION, STARTED ON TREATMENT BETWEEN JANUARY 1, 1943 AND APRIL 1, 1944; REHABILITATION RELATED TO DIAGNOSTIC GROUPS, ATTACK, AND DURATION OF ATTACK AT SUCCESSIVE REVIEW PERIODS

	No. of cases	Number rehabilitated		
		4-mo. review	12-mo. review	24-mo. review
<b>Dementia præcox, hebephrenic</b>				
First attack, duration 0-1 yr.....	1	1	1	1
First attack, duration longer than 1 yr.....	3	0	0	0
Second or more attack, duration 0-1 yr.....	1	0	1	1
Second or more attack, duration longer than 1 yr.....	4	1	2	2
Total .....	9	2 (22%) (15)	4 (44%) (18)	4 (44%) (18)
Standard error of the %.....				
<b>Dementia præcox, catatonic</b>				
First attack, duration 0-1 yr.....	4	3	4	4
First attack, duration longer than 1 yr.....	8	3	2	3
Second or more attack, duration 0-1 yr.....	2	0	2	2
Second or more attack, duration longer than 1 yr.....	1	0	0	0
Total .....	15	6 (40%) (13)	8 (53%) (13)	9 (60%) (13)
Standard error of the %.....				
<b>Dementia præcox, paranoid</b>				
First attack, duration 0-1 yr.....	6	2	3	3
First attack, duration longer than 1 yr.....	9	3	4	5
Second or more attack, duration 0-1 yr.....	1	0	0	1
Second or more attack, duration longer than 1 yr.....	1	1	0	1
Total .....	17	6 (37%) (12)	7 (41%) (12)	10 (59%) (12)
Standard error of the %.....				
<b>Manic-depressive, manic</b>				
First attack, duration 0-1 yr.....	3	1	2	2
First attack, duration longer than 1 yr.....	1	0	0	0
Second or more attack, duration 0-1 yr.....	7	3	5	5
Second or more attack, duration longer than 1 yr.....	1	1	0	0
Total .....	12	5 (42%) (15)	7 (58%) (15)	7 (58%) (15)
Standard error of the %.....				
<b>Manic-depressive, depressed</b>				
First attack, duration 0-1 yr.....	1	0	0	0
First attack, duration longer than 1 yr.....	1	1	1	1
Second or more attack, duration 0-1 yr.....	5	4	4	4
Second or more attack, duration longer than 1 yr.....	1	0	1	1
Total .....	8	5 (63%) (18)	6 (75%) (16)	6 (75%) (16)
Standard error of the %.....				
<b>Manic-depressive, other types, and involutionals (6 diagnoses)*</b>				
First attack, duration 0-1 yr.....	2	0	1	1
First attack, duration longer than 1 yr.....	3	2	3	2
Second or more attack, duration 0-1 yr.....	4	2	4	3
Second or more attack, duration longer than 1 yr.....	2	1	1	2
Total .....	11	5 (45%) (16)	9 (81%) (12)	8 (72%) (15)
Standard error of the %.....				

TABLE 12 (CON'T)

	No. of cases	Number rehabilitated		
		4-mo. review	12-mo. review	24-mo. review
Psychoneurosis (7 diagnoses)†				
First attack, duration 0-1 yr.....	5	4	4	4
First attack, duration longer than 1 yr.....	12	9	9	11
Second or more attack, duration 0-1 yr.....	2	2	2	1
Second or more attack, duration longer than 1 yr.....	1	0	0	1
Total .....	20	15 (75%)	15 (75%)	17 (85%)
Standard error of the %.....		(10)	(10)	(8)
Miscellaneous (15 diagnoses)‡				
First attack, duration 0-1 yr.....	11	8	10	10
First attack, duration longer than 1 yr.....	9	6	7	5
Second or more attack, duration 0-1 yr.....	11	6	5	5
Second or more attack, duration longer than 1 yr.....	3	1	1	1
Total .....	34	21 (62%)	23 (68%)	21 (62%)
Standard error of the %.....		(8)	(8)	(8)
All diagnoses (126 women) (33 diagnoses)				
First attack, duration 0-1 yr.....	33	19 (58%)	25 (76%)	25 (76%)
First attack, duration longer than 1 yr.....	46	24 (52%)	26 (56%)	27 (59%)
Second or more attack, duration 0-1 yr.....	33	17 (52%)	23 (70%)	22 (67%)
Second or more attack, duration longer than 1 yr.....	14	5 (36%)	5 (36%)	8 (57%)
Total .....	126	65 (52%)	79 (63%)	82 (65%)
Standard error of the %.....		(4.5)	(4.3)	(4.3)

\* This group includes 3 involuntional melancholia, 2 involuntional paranoid, 1 involuntional psychosis—other type, 2 manic-depressive, circular, 2 manic-depressive, mixed, and 1 manic-depressive, other type.

† The psychoneuroses include 2 psychasthenia, 1 neurasthenia, 6 hypochondriasis, 2 reactive depression, 3 anxiety state, 1 anorexia nervosa, and 5 mixed psychoneurosis.

‡ The miscellaneous group includes 1 general paresis, 1 postinfectious psychosis, 1 psychosis with glandular disorder, 2 psychosis with other somatic disease, 1 psychosis with other diseases of the brain and nervous system, 3 psychosis with cerebral arteriosclerosis, 1 dementia præcox—undifferentiated, 5 dementia præcox—other types, 2 paranoid condition, 2 psychopathic personality with psychosis, 4 psychopathic personality without psychosis, 3 mental deficiency with psychosis, 2 mental deficiency without psychosis, 1 psychosis with drug addiction, and 3 undiagnosed psychosis.

24-month review compared to that at the 12-month review. This is significantly noticeable for the dementia præcox, paranoids; namely, 41% at the 12-month review and 59% at the 24-month review. The manic-depressive, "other types," and involuntional, and the miscellaneous groups, show a slight decrease at the 24-month review compared to the 12-month review.

Analysis of the age distribution at the start of treatment in relation to rehabilitation at the 4-month review shows that, although the median age of the unrehabilitated women was 39 years compared to 33 years for the rehabilitated women, the middle 50% range of the 2 groups is nearly identical (Table 13 #).

Table 14 and Fig. 10 show the cumulative rehabilitation rates according to the cumulative number of treatments at the various review periods. The over-all rehabilitation rates are 52%, 63%, and 65% for the re-

spective periods. It is apparent that the gain for the group as a whole is not significant between the first and second year after the start of treatment. There was some shift of individuals during that period, but the relapsing patients nearly counterbalanced those who went on to rehabilitation.

The 12 unrehabilitated cases at the 24-month review who received only 1 to 10 treatments included 3 patients who, in spite of treatment, died of an acute fulminating psychosis; 1 hebephrenic who was transferred to another institution; 1 mental deficiency without psychosis and 2 paranoid præcoxes with mental deficiency who remained in the hospital because of their mental deficiency; 1 general parietic who did not show a favorable response to 4 treatments; 1 chronic paranoid præcox who was given a trial of 8 treatments without improvement; 2 psychopathic personalities without psychosis who remained in the hospital because

TABLE 14

THE 126 WOMEN RECENT ADMISSIONS TREATED WITH ELECTROSHOCK ONLY, AND WITHIN 4 MONTHS AFTER ADMISSION, STARTED ON TREATMENT BETWEEN JANUARY 1, 1943 AND APRIL 1, 1944;  
CUMULATIVE REHABILITATION RATES RELATED TO THE CUMULATIVE  
NUMBER OF TREATMENTS

		Cumulative number of treatments up to the date of review					Total
		1-5	1-10	1-20	1-40	(Dead)	
<i>4-Month review</i>							
<i>126 Women</i>							
Cumulative No. of cases.....	37	76	109	126	(4)	126	
Cumulative No. rehabilitated.....	25	51	63	65		65	
Cumulative % rehabilitated.....	20%	40%	50%	52%		52%	
See Fig. 10, Curve A							
Standard error of the %.....	3.6	4.4	4.5	4.5		4.5	
<i>12-Month review</i>							
<i>126 Women</i>							
Cumulative No. of cases.....	34	62	99	124	(4)	126	
Cumulative No. rehabilitated.....	26	47	69	78		79	
Cumulative % rehabilitated.....	21%	37%	55%	62%		63%	
See Fig. 10, Curve B							
Standard error of the %.....	3.6	4.3	4.4	4.3		4.3	
<i>24-Month review</i>							
<i>126 Women</i>							
Cumulative No. of cases.....	33	56	73	118	(5)	126	
Cumulative No. rehabilitated.....	25	44	69	81		82	
Cumulative % rehabilitated.....	20%	35%	55%	64%		65%	
See Fig. 10, Curve C							
Standard error of the %.....	3.6	4.3	4.4	4.3		4.3	
<i>24-Month review</i>							
<i>First attack, duration 0-1 yr.</i>							
<i>33 Women</i>							
Cumulative No. of cases.....	10	17	27	31		33	
Cumulative No. rehabilitated.....	8	14	22	25		25	
Cumulative % rehabilitated.....	24%	42%	67%	76%		76%	
See Fig. 11, Curve A							
Standard error of the %.....	7.5	8.7	8.3	7.5		7.5	
<i>First attack, duration longer than 1 yr.</i>							
<i>46 Women</i>							
Cumulative No. of cases.....	11	22	33	45	(2)	46	
Cumulative No. rehabilitated.....	7	16	24	27		27	
Cumulative % rehabilitated.....	15%	35%	52%	59%		59%	
See Fig. 11, Curve B							
Standard error of the %.....	5.3	7.1	7.6	7.5		7.5	
<i>Second or more attack, duration 0-1 yr.</i>							
<i>33 Women</i>							
Cumulative No. of cases.....	10	15	27	30	(2)	33	
Cumulative No. rehabilitated.....	8	12	19	21		22	
Cumulative % rehabilitated.....	24%	36%	58%	64%		67%	
See Fig. 11, Curve C							
Standard error of the %.....	7.5	8.5	8.7	8.5		8.3	
<i>Second or more attack, duration longer than 1 yr.</i>							
<i>14 Women</i>							
Cumulative No. of cases.....	2	2	6	12	(1)	14	
Cumulative No. rehabilitated.....	2	2	4	8		8	
Cumulative % rehabilitated.....	14%	14%	29%	57%		57%	
See Fig. 11, Curve D							
Standard error of the %.....	9.3	9.3	12.6	13.7		13.7	

of the  
elderly  
just  
that  
rehab  
if the  
treat  
to ex  
Ta  
habil  
cordi  
conse  
the m  
less a  
ing a

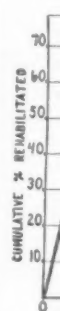


Fig.  
lative  
numb  
4-mon  
review

patie  
the a  
befor  
The  
time  
realiz  
This  
dency  
than  
name  
review  
bette  
of sh  
long  
76%  
year  
long  
dura  
more  
Ta  
numb

of their psychopathic personalities; and 1 elderly anxiety state who made a partial adjustment with 7 treatments. It is unlikely that any of these patients would have been rehabilitated at the 24-month review even if they had been given a large number of treatments, and therefore it is not legitimate to exclude them from the statistics.

Table 14 also shows the cumulative rehabilitation rates at the 24-month review according to attack and duration of attack. A conservative plan has been used in estimating the number and duration of the attack. Unless a period of good social adjustment lasting at least 6 months has been enjoyed, that

view periods, according to attack and duration of attacks, comparing the rehabilitated cases with the unrehabilitated cases. This table shows a consistent trend for the unrehabilitated patients to be given more treatments than the rehabilitated ones. This is a good measure of the persistence in the treatment program in an attempt to bring about rehabilitation in the resistant cases. A number of patients for whom the usual number of treatments was insufficient did respond to this persistent therapy.

In this series practically all treatments

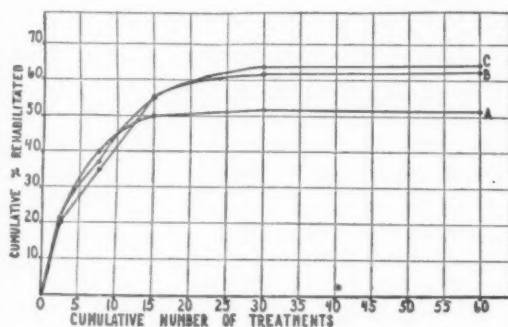


FIG. 10.—126 women recent admissions—cumulative rehabilitation rates related to cumulative number of treatments at various review periods. A. 4-month review. B. 12-month review. C. 24-month review. See Table 14.

patient is considered as still continuing with the attack which may have been in process before a briefer period of good adjustment. The onset of the attack is taken to be the time of onset of the first mental symptoms as realized in retrospect by the informants. This classification of the cases reveals a tendency for first attacks with duration of less than 1 year to respond best to treatment; namely, 76% rehabilitated at the 24-month review. However, there also appears to be a better response in a second or more attack of short duration than in a first attack of long duration. The rehabilitation rates are 76% for the first attack, duration 0 to 1 year; 59% for the first attack, duration longer; 67% for the second or more attack, duration 0 to 1 year; and 57% for second or more attack, duration longer (see Fig. 11).

Table 15 shows the distribution of the number of treatments at the respective re-

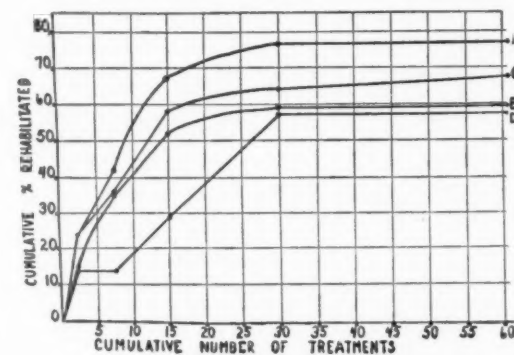


FIG. 11.—126 women recent admissions—cumulative rehabilitation rates related to cumulative number of treatments at 24-month review. A. First attack, duration 0-1 year. B. First attack, duration longer than 1 year. C. Second or more attack, duration 0-1 year. D. Second or more attack, duration longer than 1 year. See Table 14.

were grand-mal treatments. Somerfeld-Ziskind and Ziskind(6) had the impression that the occurrence of a few subconvulsive treatments impaired the prognosis. Their contention influenced the program of the author, but it is not possible to evaluate critically this point at this time. In this series there was no apparent detrimental effect in the small number who did have one or two subconvulsive treatments in addition to their grand-mal treatments. Some of the treatments were preceded by intravenous sodium thioethylamyl or by intravenous sodium amytal, and other variations in procedure were tried; but it appears that the most important factor was the production of grand-mal treatments as frequently as indicated by the patient's clinical condition. This meant that most patients were started out on a daily treatment program and the frequency was decreased

TABLE 15

THE 126 WOMEN RECENT ADMISSIONS TREATED WITH ELECTROSHOCK ONLY, AND WITHIN 4 MONTHS AFTER ADMISSION, STARTED ON TREATMENT BETWEEN JANUARY 1, 1943 AND APRIL 1, 1944;  
DISTRIBUTION OF TREATMENTS AT VARIOUS REVIEW PERIODS ACCORDING TO ATTACK AND DURATION OF ATTACK COMPARING REHABILITATED AND UNREHABILITATED CASES

	Number of treatments		
	Median	Middle 50%	Total range
<b>4-Month review</b>			
<i>Rehabilitated (65 women)</i>			
First attack, duration 0-1 yr.....	7	3.5-11.5	1-26
First attack, duration longer than 1 yr.....	6	5 - 9.5	3-19
Second or more attack, duration 0-1 yr.....	6	3 -10	1-14
Second or more attack, duration longer than 1 yr....	7	3 - 9	3-10
<i>Others (61 women)</i>			
First attack, duration 0-1 yr.....	9.5	5 -14	3-34
First attack, duration longer than 1 yr.....	14.5	8 -21	4-33
Second or more attack, duration 0-1 yr.....	15	8 -21	3-34
Second or more attack, duration longer than 1 yr....	16	13 -23	9-38
<b>12-Month review</b>			
<i>Rehabilitated (79 women)</i>			
First attack, duration 0-1 yr.....	8	4 -14	1-37
First attack, duration longer than 1 yr.....	7	5 -11	3-21
Second or more attack, duration 0-1 yr.....	10	4 -19	1-47
Second or more attack, duration longer than 1 yr....	16	3 -18	3-27
<i>Others (47 women)</i>			
First attack, duration 0-1 yr.....	9	6 -18.5	5-37
First attack, duration longer than 1 yr.....	18	6 -28	1-43
Second or more attack, duration 0-1 yr.....	11	6 -16	4-38
Second or more attack, duration longer than 1 yr....	24	16 -31	13-40
<b>24-Month review</b>			
<i>Rehabilitated (82 women)</i>			
First attack, duration 0-1 yr.....	8	4 -14	1-26
First attack, duration longer than 1 yr.....	8	5.5-17.5	3-36
Second or more attack, duration 0-1 yr.....	10	4 -19	1-47
Second or more attack, duration longer than 1 yr....	21	8 -26	3-31
<i>Others (44 women)</i>			
First attack, duration 0-1 yr.....	13.5	6 -27.5	5-43
First attack, duration longer than 1 yr.....	22	8 -29.5	1-51
Second or more attack, duration 0-1 yr.....	14	8.5-23	4-56
Second or more attack, duration longer than 1 yr....	23.5	16 -44	13-47
<b>24-Month review</b>			
<i>Dementia præcox, hebephrenic</i>			
Rehabilitated (4 women).....	11.5	4 -19	3-27
Others (5 women).....	25	13 -42	8-44
Total .....	19	8 -27	3-44
<i>Dementia præcox, catatonic</i>			
Rehabilitated (9 women).....	14	7 -31	2-47
Others (6 women).....	43.5	26 -47	1-51
Total .....	31	9 -45	1-51
<i>Dementia præcox, paranoid</i>			
Rehabilitated (10 women).....	19	14 -21	8-36
Others (7 women).....	15	6.5-19	4-33
Total .....	19	10 -21	4-36

as the patient showed signs of response to the treatments.

The significance of the results obtained in our total series is confused by the various spontaneous improvement rates for different diagnostic groups. The statistical results with alcoholics are good, but spontaneous partial adjustment is high for short periods. Furthermore, some patients such as psychopathic personalities with psychosis and mental deficiency with psychosis may show marked improvement in their psychoses but still may not be rehabilitated because of the handicap of the underlying psychopathic personality or mental deficiency. In CNS syphilis we have occasionally seen marked benefit so that we feel it is worth a trial, but only one-third of those treated with electroshock were rehabilitated within one year. They were also given intensive antiluetic therapy.

In general it can be said that the early cases with a variety of symptoms have a good prognosis. We have found that psychoses with infectious diseases and certain similar conditions respond well to electroshock therapy. We have had gratifying results in relieving some of the elderly people of their distressing symptoms even though the organic changes remain a handicap. For example, the impairment of recent memory improves only as much as can be accounted for by improved attention.

There is a high initial rate of improvement among the involuntions and the manic-depressives, but the evidence is confused by the fairly high rate of spontaneous improvement over a period of months. Clinically there is clear evidence that the course of the depressions is shortened and most manics are made more manageable during their manic period. Some of these patients have relapsing tendencies so that treatments have to be repeated from time to time. Such a program makes it important that the treatments not cause any cumulative brain damage.

Although dementia praecox, hebephrenic cases are numerous among the chronic hospital population, only 6% of the first admissions were so classified. Most cases so diagnosed at our hospital have had a rather prolonged history of early psychotic symptoms before entering the hospital (see Table 12). It is my impression that this is a diag-

nosis that usually implies that the illness has already become chronic. It is possible that with early adequate treatment we are preventing the development of some cases of hebephrenia. In review of these cases, those who responded well were not as classical in their symptoms as those who did not.

The so-called dementia praecox, catatonic type, includes a complex group of psychotic patients. Some of them respond well to treatment, but others are very resistant. Here again it appears that the classical catatonic stupor may quickly become a chronic pattern. In the acute fulminating cases we have had a number of spectacular recoveries, but, once the catatonic under-activity persists after mental contact with the environment has been reestablished to some extent, the pattern is very resistant to treatment. Table 15 shows that the catatonic patients were given the largest number of treatments; namely, a median of 31 treatments and a total range of 1 to 51 treatments.

About 40% of our dementia praecox, paranoid cases when treated promptly are home, fairly well adjusted, within a year after the start of treatment, but some of these do not have adequate insight into their delusions. However, some of these cases do make remarkable improvement with the development of clear insight. Some attain this degree of improvement even after a long relapsing course, if their relapses are persistently treated, bringing the rehabilitation rate to about 60% at the 24-month review.

The psychoneuroses who come to our hospital usually have depressive features and respond well to treatment. Those with obsessive ideas are long-range problems. The brain facilitation from the treatments is a valuable adjunct to the treatment program, but a good deal of psychotherapy is necessary over a long period of time in order to get good results. As a group, about 75% of our psychoneurotics are home, improved, within 4 months after the start of treatment.

Nearly 800 other treated patients have been coded and analyzed. These readmissions, transfers, cases of delayed treatment, and patients who were also given other types of shock therapy respond to treatment variably, according to whether they have become more like the most chronic patients or

MONTHS  
44;  
0

Total range

1-26  
3-19  
1-14  
3-10

3-34  
4-33  
3-34  
9-38

1-37  
3-21  
1-47  
3-27

5-37  
1-43  
4-38  
13-40

1-26  
3-36  
1-47  
3-31

5-43  
1-51  
4-56  
13-47

3-27  
8-44  
3-44

2-47  
1-51  
1-51

8-36  
4-33  
4-36

whether they are still reacting more like the early cases.

### CONCLUSIONS

1. Forty percent of the most chronic patients showed significant improvement in ward behavior if adequately and repeatedly treated with suitable type of electroshock therapy. Relapses must be treated whenever they occur over months and years.

2. At least 60% of early cases, aged 60 or under, were rehabilitated within 1 year when adequately treated and 65% by the end of the second year after the start of treatment.

3. Adequate treatment means intensive treatment until the expected improvement has occurred and intensive treatment of relapses when they occur. No patient, otherwise suitable who still is not rehabilitated after 1 year, has had an adequate trial of treatment with less than 20 treatments.

4. An ideal therapy is one which achieves beneficial results without causing accumulating brain damage, thus permitting its use repeatedly for years if necessary.

5. This ideal is approached by the relatively low intensity 60-cycle pulsating direct

current used in the treatment of the patients reviewed in this paper. This technique also has been accompanied by an exceptionally low percentage of skeletal complications.

### BIBLIOGRAPHY

1. Friedman, E., and Wilcox, P. H. Electro-stimulated convulsive doses in intact humans by means of unidirectional currents. *J. Nerv. and Ment. Dis.*, 96: 56-63, July 1942.
2. Liberson, W. T., and Wilcox, P. H. Electric convulsive therapy; comparison of "brief stimuli technique" with Friedman-Wilcox-R  ter technique. *Dig. Neurol. and Psychiat.*, 8: 292-302, May 1945.
3. Danziger, L., and Kindwall, J. A. Prediction of the immediate outcome of shock therapy in dementia pr  cox. *Dis. Nerv. Syst.*, 7: 299-303, Oct. 1946.
4. Wilcox, P. H. Brain facilitation not brain destruction the aim of electroshock therapy. *Dis. Nerv. Syst.*, 7: 201-204, July 1946.
5. Dedichen, H. H. A comparison of 1459 shock treated and 969 nonshock treated psychoses in Norwegian hospitals. *Acta Psychiat. et Neurol. Suppl.*, XXXVII, 1946.
6. Somerfeld-Ziskind, E., and Siskind, E. Prevention of subconvulsive reactions in convulsive therapy for psychoses. *J. Nerv. and Ment. Dis.*, 99: 889-894, June 1944.
7. Handbook of Chemistry and Physics, Chemical Rubber Pub. Co., Cleveland, Ohio. 22d Edition, 1937.
8. Lindquist, E. F. A first course in statistics. Houghton, Mifflin Co., N. Y., 1938.

During  
citizens  
paper r  
and the  
ders fo  
curred i  
of burg  
was fou  
ex-Wav  
lip stic  
catch m  
trol my  
years v  
member  
and dra  
delivere  
dreds o  
dential

On J  
cepted a  
deavorin  
on the h  
duced by  
turning  
routine  
official  
flourish  
note. E  
and no  
against  
17-year  
He was  
House  
from s  
answer  
tioners.  
he was  
William  
mental  
malinge  
ranged  
by Drs

<sup>1</sup> Direc  
pital, Ne

<sup>2</sup> Direc  
Ill.

<sup>3</sup> Direc  
of Cook

## A STUDY OF WILLIAM HEIRENS

FOSTER KENNEDY,<sup>1</sup> M.D., HARRY R. HOFFMAN,<sup>2</sup> M.D., AND  
WILLIAM H. HAINES,<sup>3</sup> M.D.

During the year 1945 and early in 1946 the citizens of Chicago were horrified by newspaper reports of three atrocious murders and the beating of a nurse. All the murders followed a pattern, in that they occurred in small apartments and no evidence of burglary or other apparent motivation was found. In one apartment, in which an ex-Wave was brutally killed, appeared in lip stick on the wall, "For heaven's sake catch me before I kill more; I cannot control myself." In another, a child of six years was kidnapped and her body dismembered and thrown into various sewers and drains. A ransom note was written and delivered to her parents. In addition, hundreds of burglaries were reported in a residential area in the north side of Chicago.

On June 26, 1946, a young man was intercepted after an attempt at burglary. In endeavoring to make his getaway he was hit on the head with a flower pot and finally subdued by a policeman off duty, who was returning from a nearby bathing beach. A routine arrest followed, until an alert police official noticed the similarity of a curve flourish in his signature and the ransom note. By this time several days had elapsed and no formal charge had been booked against the youth. He was, it developed, a 17-year-old University of Chicago student. He was being held in the hospital of the House of Correction in Chicago, suffering from scalp wounds. Here he refused to answer questions, and mimicked his questioners. Saturday afternoon, June 29, 1946, he was seen by Drs. Francis J. Gerty and William H. Haines for an opinion of his mental status. It was thought that he was malingering. Another interview was arranged and he was examined the same night by Drs. Roy R. Grinker and William H.

Haines, at which time a conclusion was reached that he was malingering. During the following week he made a full confession to his attorneys regarding the atrocities and brutal murders.

In examining his record it was found that he had been arrested for burglary at the ages of 13 and 15. Finger prints were not taken because he was held by the Juvenile Court authorities. He was also arrested for carrying a gun, while returning from rifle practice at the university. This arrest occurred after the perpetration of the atrocities. The case was dismissed and he was told to register his gun.

While in jail awaiting trial, three notes he had written were intercepted. In one of these he denied all the crimes, and in the others—to his parents—he admitted the burglaries.

A psychiatric examination was ordered by the court before trial, at the request of his attorneys and the state's attorney. The commission consisted of Dr. Harry R. Hoffman, state alienist and director of the Neuropsychiatric Institute; Dr. William H. Haines, director of the Behavior Clinic of the Criminal Court of Cook County, and a third member to be from outside the State of Illinois. Dr. Foster Kennedy, director of the neurological service at Bellevue Hospital in New York City and ex-president of the American Neurological Association, was selected. Dr. Francis J. Gerty, head of the department of Psychiatry at the University of Illinois, and Dr. Francis J. Braceland, ex-chief of Psychiatry in the Navy and now at Mayo Clinic in Rochester, Minn., were also contacted, but were unable to serve because of other commitments.

The Supreme Court in Illinois had handed down opinions regarding the mental status of defendants at the time of going to trial, to wit: "BEFORE TRIAL.—He is not considered a lunatic or insane if he is capable of understanding the nature and object of the proceedings against him and if he rightly comprehends his own condition in reference

<sup>1</sup> Director Neurological Service, Bellevue Hospital, New York, N. Y.

<sup>2</sup> Director Neuropsychiatric Institute, Chicago, Ill.

<sup>3</sup> Director Behavior Clinic of the Criminal Court of Cook County, Chicago, Ill.

to such proceedings and has sufficient mind to conduct his defense in a rational or reasonable manner, although upon some other subjects his mind may be deranged or unsound."<sup>4</sup> The examiners were agreed in their opinion that the defendant was able to stand trial and submitted a joint report of 32 pages.<sup>5</sup> In this report to the court many of Heirens' answers were given verbatim. These have been condensed in this article to conserve space.

#### REPORT TO THE COURT DATED SEPTEMBER 3, 1946

William Heirens was examined pursuant to an order of the Honorable Harold G. Ward, Chief Justice of the Criminal Court of Cook County. This order was entered after a conference between the state's attorney and the counsel for the defense. We were asked to make a comprehensive report. To this end we were instructed to obtain all necessary expert advice, and we were provided by both prosecution and defense with all documents pertinent to the case in their possession.

*This patient, in our opinion, is not suffering from any psychosis, nor is he mentally retarded: he has average intelligence. He has a deep sexual perversion and is emotionally insensitive and unstable. He has sufficient intelligence to understand the nature and object of the proceedings against him. He rightly comprehends his own position in regard to these proceedings and has sufficient mind to conduct his defense in a rational and reasonable manner. He has repeatedly stated to us that he has always been aware of the nature and purpose of his acts, which acts are the basis of the present proceedings against him.*

Our study has included a careful survey by the social service department of the patient's early life and environment. We have interviewed the patient's parents and his roommate at the university. We have read the patient's statements to the state's attorney regarding his acts charged in the indictments

against him. We have spent with him in close investigation, singly or together, with the presence of a stenographer and without, about 5 or 6 hours a day since the 12th of August. These investigations were conducted privately in the quiet of the chapel of the Cook County Jail.

In addition, he was subjected to a series of carefully selected and conducted psychological tests calculated to reveal trends, both conscious and underlying consciousness. The quality of intellect was carefully tested and he was found to have an intelligence quotient of 110, an average figure. The Rorschach test was used and failed to reveal any psychosis.

At the Illinois Neuropsychiatric Institute several electroencephalographic tracings were taken and found completely normal. X-ray studies of skull and spinal column were normal. The basal metabolic rate was normal. A complete blood study, insulin tolerance and urine test proved normal. The spinal fluid was normal, as were also the Wassermann and Kahn tests of the blood.

We have examined his notebooks made during the past three years. We have studied the post-mortem reports of the murders.

#### Social History

The patient is a 17½-year-old white boy, born in Evanston, Ill., of native-born parents of Luxemburg descent. The family history, as given, is negative as to insanity, epilepsy, alcoholism or mental defectiveness. The father grew up in a floral business with his father, and opened a store and conservatory of his own soon after marriage, flower arrangements being his specialty. The family occupied a flat in connection with the store. With the depression, the business failed and although several attempts were made to re-establish themselves in different locations, none was successful. After a period of irregular employment, the father secured work on the police force of Carnegie Steel Company, about 8 years ago, and has now worked up to the position of special investigator. In addition, he works several evenings on the Lincolnwood Village police force. The mother has worked much of the time since marriage, both to supplement the income and because she enjoyed it, working in their own

<sup>4</sup> Insanity and the Criminal, William H. Haines, M.D., and Harry R. Hoffman, M.D., Medical Clinics of North America, January 1945.

<sup>5</sup> To be published in full in the Journal of Criminal Law and Criminology.

and other florist shops, in a bakery as a fancy pastry maker, and more recently designing and executing custom made clothes. The mother handles the family finances. The patient expressed some concern over his mother's work, feeling it was done to pay his school tuition, but she preferred to do so and employ someone to do the housecleaning, etc.

The patient is the elder of two brothers. Family religion is Roman Catholic. Early in the pregnancy with the patient, the mother feared she would miscarry. Labor was long (62 hours) and delivery difficult with high forceps employed. The patient weighed 8 pounds and 5 ounces and was 24 inches long at birth. Breast feedings were inadequate and extremely painful to the mother and were supplemented by bottle feedings almost from the beginning. Weaning from the breast was completed by age of one month. He presented a feeding problem from the beginning—he "vomited in a gush" after every feeding and was sickly and severely underweight for the first 3 months. Thereafter under different care and diet he began to gain weight. Teething presented no problem. The ages of walking and talking are unknown; the mother reports "the usual age." The mother reported that toilet training was completed early; after 8 months there was no nocturnal wetting and by one year, daytime bladder and bowel control had been established. No relapses were reported.

At 7 months while unattended he fell from his buggy to a cement basement area 12 feet below, injuring his head. He was not unconscious when his mother found him. At age 8 or 9 he fell from a trapeze and sustained a compound fracture of the bones of the right arm, necessitating an open reduction. When about 12, he fell down some cement stairs at school, cutting his head over the eye. Patient fainted then. At the age of 8, he had a tonsillectomy with severe hemorrhage and some complications. He also had chicken pox and measles as a child. In the summer of 1942 and again in the spring of 1946, he complained of severe headaches. Otherwise the health history is negative.

He was a solitary child and youth, sensitive but difficult to know. Apparently no one ever had a close or confidential relationship with him. Certainly his parents did not. As a child he was with his brother a good deal

and had to fight his battles for him. He never had any real friends and preferred to be alone. In the 7th and 8th grades excessive day dreaming was reported. He had some mechanical interests and considerable skill, according to the parents, repairing electric motors, repairing or making radios from old parts. He was interested in collecting and recently had a considerable coin collection. Very early he was eager to earn his own money—worked delivering orders for a food store the summer he was 12, delivered for a liquor store the summer he was 14, and worked in the steel mills with his father the summers of 1944 and 1945. He was very frugal with his money, spent little on himself, just saved it. His only "splurge" was in gifts for the family, buying expensive presents out of proportion to his earnings. Very early he learned not to whimper or cry when hurt and could endure considerable physical pain.

He attended public school kindergarten for a few months at age 5 and entered parochial school at 6. He attended three parochial elementary schools, as the family moved, and graduated from 8th grade (receiving his diploma *in absentia* since he was then in the Juvenile Detention Home) at age of 13.

In June, 1942, at the age of 13, he was first apprehended by the police trying to break into a basement storeroom. Subsequently he admitted 9 burglaries within the preceding 6 months. Following the juvenile court hearing, he was committed to Gibault School for Boys and remained there from July 5, 1942 to June 4, 1943. Except for an attempt to run home 3 weeks after commitment, he presented no discipline problem and exteriorly was a conformist according to report received. He was obedient and cooperative, with good attitude toward authority. He completed his first year of high school here with scholastic averages all in the 80's. He was quiet and serious, "definitely an introvert," and would often be found away from campus completely alone. He had few friends and preferred to be by himself. He was not interested in athletics; team games especially did not appeal to him. He expressed a good attitude toward religious obligations, frequently took Holy Communion, went to confession less regularly at school than

lately. He did not want to know anyone intimately.

Two months after his return from Gibault, he was again arrested, charged with burglary. In Juvenile Court the case was heard before a visiting judge who acceded to the family's wishes. The patient was placed on probation to go to St. Bede's Academy at Peru, Illinois, where he remained from September, 1943 to May 27, 1945, but was at home for summer vacation in 1944 and 1945. He completed 2d and 3d years of high school there. This school report showed grades of "A" and "B" in all subjects for his sophomore year, from "A" to "F" (English) in junior year. His adjustment was good, no discipline problem, he had no confidential relationship with anyone and preferred to be alone. Probation was terminated January 19, 1945.

In September, 1945 he entered the University of Chicago, taking placement tests, remaining there until his apprehension during the summer quarter of 1946. His scholastic record there was average and below. He had many absences from academic and physical education classes. According to the mother, he was active in the Calvert Club (a Catholic organization, social and religious). He seemed to have at least a superficial relationship with a few students and finally began to have a few "dates" with girls, though with no close friends.

According to the parents, the patient never displayed any of the usual sexual curiosity as a child nor displayed any jealousy of his brother three years younger. No sex instructions were given by the parents. At the age of about 13, there was an incident of sex play which patient witnessed in the boys' toilet at school and reported to his mother, at which time he was warned about venereal disease. This was a few months before the first known burglary. The parents were unaware of his delinquencies until after he was apprehended, but since his earlier court appearance have been constantly fearful of a repetition, though trying to trust him.

#### *Physical Examination*

The patient was carefully examined physically. He is a well built young man weighing 159 pounds. There were no deformities excepting a scar on right forearm, the result of a compound fracture when aged about 10. No evidence was found of any structural

abnormality in the central, autonomic or peripheral nervous systems. The hands were moist and over-cold and without tremor. There was a remarkable reduction to the perception of pin pricks, however strong, as "pain." This was present all over the body with the exception of the glans penis. Sharp pin pricks inside the nose on the mucous membrane and the soles of the feet were denied as being painful and no motion of withdrawal was made there or elsewhere. This was also true as regards the mucous membrane of the lip, and the scrotum and body of the penis. A sharp needle could be pressed more than four millimeters under the nails without inducing pain or defense withdrawal movements. As the sensory examination proceeded, this "analgesic cloak" deepened in quality under suggestion, so that below a sharp circle round both arms level with the upper edge of the anterior wall of the armpits he became unable to feel pin prick as other than "not blunt." The corneal reflexes at first were greatly reduced, and at the close of this examination had disappeared so that it became possible to tap the eyeballs with a closed safety pin without his winking or giving any motor sign of sensation. Deep pain produced by pressure on calf muscles and Achilles tendons and the testes was also reduced. As regards his ability to perceive light touch, he missed two out of three stimulations in scattered distribution over the body. The perception of vibration and the other forms of sensation were normal. The visual fields were found to narrow progressively as the test continued, so that they became finally almost pin-point. This phenomenon is known as "a spiral" or "helicoid" visual field, and is a positive objective indication of profound hysteria.

This striking reduction of power to appreciate painful stimulation as such, together with its remarkable deepening as the result of suggestion, is to us a clear proof of the patient's hysterical personality.

The blood pressure, heart, lungs and abdomen were normal. He is powerfully built with fine muscular development; he excelled in wrestling.

#### *Psychiatric Examination*

The psychiatric interviews, to which allusion has already been made, consisted in

quiet, P  
the ans  
He was  
and in  
His stat  
record  
patient  
point of  
peat tha  
our gre  
evidenc  
forces a

We p  
sible an  
and em  
sofar a  
quotation  
be patie

When  
interest  
"the st  
He beg  
lines, th  
strange  
open or  
women'  
nor was  
of his r  
pair of  
would t  
on, exp  
pletion.

some h  
his gran

We l  
objectiv  
his stat  
brought  
"a card  
of wom  
mostly

When  
the des  
through  
citemen  
took ob  
undercl  
added s  
to brea  
he had  
est in  
was r  
enced c  
window  
his des

quiet, persistent questioning, while noting the answer and its emotional accompaniment. He was informed of his constitutional rights and in reply promised his full cooperation. His statements to the state's attorney are on record and indeed have been published. The patient was, of course, taken over every point of these. We shall try here not to repeat that information but to give enough of our great mass of material to display new evidence and new viewpoints on the dynamic forces at work in this patient.

We propose now to give as briefly as possible an account of the significant actions and emotional reactions of this patient insofar as they could be discovered. When quotation marks are used, the quotations will be patient's own words.

When aged 9, the patient began to be interested in "the feeling and color" and then "the stealing" of women's underclothing. He began to take these at first from clothes lines, then from basements, and later from strange houses, the doors of which he found open or ajar. Dresses or other articles of women's apparel made no appeal to him nor was he interested in the undergarments of his immediate family. Having secured a pair of women's panties or drawers, he would take it to a basement or home, put it on, experience excitement and sexual completion. Most garments he then threw away, some he replaced, and some he hoarded in his grandmother's attic.

We believed it important, if possible, by objective evidence to prove the truth of his statement of fetishism. An investigation brought to light, in the spot he had described, "a cardboard box" containing some 40 pairs of women's old, used panties or drawers, mostly made of rayon and brightly colored.

When 12 or 13 years of age, he secured the desired garments by going into houses through windows. This furnished more excitement. After three such expeditions, he took objects ("guns or money") other than underclothes; a change which was again an added stimulation. "It seemed sort of foolish to break in and not take anything." When he had thus changed his objective, the interest in underclothes largely evaporated and was replaced by the excitement experienced on "making an entrance" through the window. Often he would struggle against his desire to leave his room at night, but

when he did leave it was for the purpose of committing burglaries. He had sexual excitement or an erection at the sight of an open window at the place to be burglarized. Going through the window he had an emission. Later it took several entrances to produce the emission. If startled in the act of burglarizing he immediately killed, stating, "It was the noise that set me off, I believe. I must have been in a high tension and the least bit of noise would disturb me in that manner." In describing the disposal of the 6-year-old Degnan girl's body, he said, "It is just like a floor with holes in it. I've tried to look through the holes to see what is down below. There is not enough holes to find out"—referring to his memory. His phrase "sexual excitement" was expanded: "I nearly always have to urinate or have a bowel movement—it always preceded the urge; when I first noticed it, I was in the basement and I had a bowel movement." Often when sexual completion occurred in the entered room it was accompanied or preceded by defecation or urination, or both. He would leave the consequences in the room or would find them later in his own clothes. After an emission, he would always leave the entered house without taking anything with him. After assaulting Miss Peterson, the nurse, he had an orgasm and without striking her again he left and returned to his room at the university. He later returned to the Peterson apartment, administered first aid, and tried by telephone to get help for her.

After an emission was the only time he felt he had done wrong. We believe, from other statements, by this remark he meant that only immediately after orgasm did he suffer from the pang of conscience. This compelling "urge" had clearly a dynamic sexual origin, and the emptying of bowel and bladder was due to an overflow spinal reflex; so we asked him had he never relieved this tension by manual manipulation. On one occasion he indignantly denied even the attempt despite all his experience with underclothes, occurring as often as four times a week. Later he said he tried this method twice without success. In the same manner, he at first denied ever having attempted any sex play with girls. Two days later with one of his rare shows of emotion he said, looking much ashamed, that twice,

later correcting himself to eight times, he had touched girls "on the breasts" and then pressed "on the leg." Always, having done this, he would immediately burst into tears and "be upset and unable to sleep." It should be noticed that no uncomfortable emotions followed either burglaries or murders. He forcibly denied ever having made any more intimate advances, except that he "kissed them" sometimes. "They wanted to kiss; I didn't."

It was clear that normal sex stimulation and experience were unpleasant, indeed "repulsive," to him, and these efforts afterward created in him a negative emotional state. He found them improper in the conduct of others; he never spoke of them except in condemnation, as for example of the young men in the university who had brought a girl into their rooms at night.

He was interested in books on sex and crime. "I read around the subject of masochism, fetishism, sadism, flagellation, also Kraft-Ebbing and dreams, some parts of Freud." At one time he said he could not read Freud because it was "dirty"—about sex. Asked which was most obnoxious, sex, burglaries or murder, he replied "sex and murder." When asked to choose between sex and murder, he nodded his head, then replied "murder." In observing the patient, he was noted not to nod his head in speaking. We believe that William Heirens nodded his head to indicate that subjectively he felt sex was worse than murder, but in verbalizing stated murder.

He felt masturbation was worse than carrying a loaded revolver or the act of burglary. However, he replied that he felt murder was worse than masturbation.

He felt he was just as "responsible as any for his burglaries." As for the murders, "Whether it is my imagination or not, I seem to be blaming everything on George. It seems so real."

The patient struggled often against the "urge" to go out and seek excitement: "I would just put my hand on the table, then the headache would get too strong and I thought if I could just get out it would help. I had to get into any old thing. When I got these urges I would take out plans and draw how to get into certain places. I would burn up the plans; sometimes they helped. I was

playing a game with myself. I would draw up plans and then burn them or tear them up. I must have drawn about 500 plans on how to enter a house or rob a train or things of that sort."

In his room, as has been already said, the urge to go out was often ushered in by a desire to go to stool. Although he knew the urge to go out could be abolished by satisfying this desire, he often neglected to do so and, accepting the "urge," went out anyway. At no time did he, despite his struggling sometimes strongly and sometimes not at all, ever seek help from anyone. He told no one. The early peccadilloes in fetishism were confessed to the priest, but the burglaries and the murders never. He sought no help from the church, his family, medicine, nor even from a charlatan. "I'd no confidence that they would not have me arrested and also that they would help me." . . . "On one occasion I took off my clothes and thought if I did that I would not be able to get out. I would get ready for bed. I resisted for about two hours. I tore sheets out of place and went into a sweat. My roommate came back from the Calvert Club, and he asked me what was wrong, and I told him I had been drinking. I had to give him some excuse. I told him to go outside until I could get things fixed up. I put on my clothes and went out. I told him I was going out for a walk. I went out and burglarized that night. . . . I had locked my clothes in the closet and put the key in the washroom. I got in bed and then the urge came on. I just stayed in bed and tried to talk him (George) out of it, but it did not work. . . . I did this about three times. It was about Christmas time once that I had locked the door and that time there were people out in the corridor. I did not want them to see me go out and I went out of the window into the gutter and went down the fire escape. At that time when I could come in there would be snow on my feet."

He denied masturbation or any sexual relationships.

A reference has been made earlier to a mysterious individual named "George," whom the patient invokes from time to time as having responsibility for the patient's crimes. Some excerpts follow from our conversation on this subject: "He was just a

1947]

realizat  
no goo  
me. At  
I went  
that Ge  
real. I  
but he  
had to  
was go  
that wa  
and I v  
there?  
would a  
because  
way. I  
then I v  
in every  
wanted  
to laugh  
ous to  
name.  
things,  
When  
ference  
freezin  
temper:  
. . . .  
ideas o  
benefac  
would  
away a  
would  
wanted  
was ju  
I woul  
to him.  
ask me  
out, an  
things.  
had a  
doing t  
One o  
George  
to Me  
name a  
into the  
in 194  
resist a  
and lat  
When  
headac  
balloon  
down i

realization of mine. I just stuck him in for no good reason. Before he seemed real to me. At Gibault things were so vague when I went out on burglary, it seemed to me that George was doing it. He seemed to be real. I cannot introduce him to anybody but he is there." . . . "Usually when I had to get out I would ask him where he was going. We would talk back and forth that way. He would say, down to the lake, and I would say, what are you going to do there? He said he would get some things. I would ask him why he was going and he said, because he wants to. It would be just that way. I would argue with him to stay and then I would get a headache. I would argue in every way possible with him but he always wanted to get out." . . . "I don't want you to laugh. It seems so darn real to me. Previous to this, I had given the whole matter a name. I just had a faint memory of these things, as to temperature or color of things. When I would go out it would make no difference to me if I had a summer suit on with freezing weather. I could not feel any temperature. I gave it the name of George." . . . "When I went out I had some vague ideas of what I would do. I took him as a benefactor for money or anything else I would take. If I did not throw the things away and have them in the morning. I would look them over and take out what I wanted and I attributed this to George. It was just a little game I was playing. . . . I would write letters to myself. I would talk to him. When I wanted to get out he would ask me where I was going, why I was going out, and what time I would be back and things of that nature. I begged him to stay. I had a headache almost all the time I was doing that. I was just stimulated to get out. One of the letters I had written was to George M. S. I figured if I could send him to Mexico. . . ." . . . "I gave him a name after I came out of Gibault. He came into the picture before I started to burglarize in 1942. In the beginning I always tried to resist and after that I tried to talk to him, and later on developed writing to him. . . . When I tried to resist him, I would get a headache. It seemed like my head was a balloon filled with water. When I would lay down it would fill the balloon and I would get

a pain. . . . He wrote about burglary. He would say that the best way to burglarize was to go in windows. He would give names of people like Mike, Joe and Harry. . . . Sometimes in the letters I would ask him for things I needed at school. I would ask him if I could borrow money from him. . . . When this urge would come out, I would tell him there would be a letter in the drawer for him. Sometimes he would answer after I wrote and then when I would read it, it would all seem new to me. I don't remember writing the answer and would not know I had written what was written. . . . I made a pact with George if I ever got caught through him that I would kill myself and kill him too. I thought that would scare him away but it never did. . . . He has to be part of me. . . ."

Asked, "In the last note you wrote, 'Catch me before I kill again; I cannot help myself,' what could you not help yourself from doing?" he answered, "From the murders. That was 'George' and I could not help what I was doing, and he was myself."

These conversations regarding "George," in our opinion, reveal a power for hysterical fantasy to be expected in a hysterical individual passing through long sustained emotional conflict. By hysteria we mean a condition produced by suggestion to an individual suffering from deep division in his emotional life. It is to be noted that in 1942 he went twice, just before George's invention, to see the movie, "Dr. Jekyll and Mr. Hyde," which "made a great impression" upon him. When asked, in his psychological examination, the name of his favorite movie, he said at once this title which was partially written down when he asked to change to, of all possible others, "Robin Hood." Only rarely did the patient for short periods lack insight into the true nature of the device he had constructed whereby he could account to himself for his actions, and at the same time enable him to continue doing them while he led otherwise an exemplary life and could continue his religious observances.

#### *Suicide Talk*

He made, after his arrest, several feeble, theatrical, puerile gestures toward suicide.

The original letters to his mother and father were given to us. These have been released to the daily press so we will not discuss them. He repeatedly stated he would commit suicide in order to do away with George. . . . In the jail he collected cigarette stubs, aspirins, pennies and small pieces of soap which he repeatedly stated were his plans for suicide.

### *Leadership*

There is in this young man an immense egocentricity. Despite his continuing failures to rule himself he has no anxiety, fears or lack of confidence in his abilities and powers. His reading revolves around the power principle: Nietzsche, Schopenhauer, and even Spinoza, of which he grasped nothing. Pictures of Hitler, Goering and Goebels are in his scrap books and his favorite studies were a sketchy intellectual interest in "mass psychology." He writes in his notebook at school: "Just who am I? I begin to wonder after all I could be human as the rest are but to myself, I would laugh at such a thought. Oh these seem so much more superior. In plain words I think I'm a worm. It's from being a worm though, I like it: insignificant and obsolete. That's just what I need. Maybe if I'm all wrong in writing this. Probable I'll change my attitude soon. It's odd but I begin to like my habits now. Probably just a passing phase. I'll most likely hate myself when I do things disagreeable to myself. . . . I wonder why I can't run the world. It seems only great men have that choice. It's funny but I don't understand why I haven't the same equal chance. I guess they probable know just where to start & I don't. Wouldn't it be great to have that much power. Men sacrifice their lives for it. There must be an easier and faster way to gain control. . . . Why am I thinking these things. It's all nonsense. Probable never ever entered another mind. You've got a good imagination, Bill, but I doubt whether you'll get far with it. So far it's gotten you into trouble. Real trouble. Well, I guess that's life for you.

"Why the fish did I ever go out for football. I detest the game and yet I go in for the sport. That's some sign of you loosing your head. In about three years you'll probable end up in a coo-coo house. . . .

"Whoever got the idea that I could do great things and so sent me to school. It's sure a mystery. Maybe if I come down to earth I'll learn sum'min. . . .

"You god damned nincompoop. Why the hell do you live is all I can wonder. Your one of the most unworthy persons I've understood to be able to live. Your sure not following your golden rules for control. In fact you've been standing still for the last two weeks."

Great News 7:20 Sept. 26 '45

"I'm now shaking with excitement. My hopes and prayers have been answered in one of my biggest chances in life. If I can only use my chance to the best advantage. The University of Chicago has accepted me into its enrollment. This is my first chance at showing how good I am to society and I intend to show even better signs. Tonight I feel as if the world were mine. All I have to do now is pray, giving thanks and vowing to do my best as humanly possible."

### *Plot VII*

"Considering my present college status, considering my inability to control society, considering that I am loosing my moral code slightly; I hereby intend to change my whole way of living. Since I have devoted more time to psychology it should be easy. My plan described in this plot should be carried out fully. I shall attack human nature to my fullest extent."

The patient, as has been seen, had no emotional disturbance whatsoever after the completion of each of three murders. After the Brown murder "The dog barked and the lady started hollering. She had on a night gown. She jumped up and hollered. Then I took the knife and stabbed her—through the throat—just to keep her quiet. Going in I had an erection. When I realized what was going on I was in the living room. The knife was at the end of the bed. I took the knife out real quickly and washed it off." Asked if he read about the act he replied, "Yes, just like anything else in the paper. It did not bother me, no remorse—I read just the beginning; then I got tired."

After the Ross murder: "She screamed—I just stabbed her once. I went to a show

downto  
work."  
"No."  
wrong  
he re  
don't  
never

Labora

The  
taken  
tute an  
rate w  
80 and  
examin  
sugar  
pressu  
gm.; t  
were  
The di  
cytes,  
blood  
Wasse  
is rep  
port o  
lows:  
with s  
abnorm  
build-  
for ag  
form  
spinal  
skull  
and c  
norma  
The s  
figura  
ture o  
are he  
pneum  
skull.  
poster  
eviden  
thorac  
the ab

Psych

Wi  
series  
psych  
trend  
scious  
Th  
tested

downtown. The next day I went back to work." Asked if it bothered him he replied, "No." Asked, "Do you feel you have done wrong now?" referring to the three murders, he replied, "I do, yes—I'm in here—but I don't feel anything about the whole matter. I never did."

#### *Laboratory Reports*

The laboratory reports of the various tests taken at the Illinois Neuropsychiatric Institute are as follows: The basal metabolism rate was  $-10\%$ , at which time the pulse was 80 and the blood pressure 125/80. The urine examination revealed a PH of 6 with no sugar or albumin, cells or casts. The blood pressure revealed a hemoglobin of 16.6 gm.; the color index was .89; the red cells were 5,690,000; the white cells were 5,650. The differential count revealed 27% lymphocytes, 7% monocytes, 66% neutrocytes. The blood serology was negative in the Kahn and Wassermann tests. The insulin tolerance test is reported within normal limits. The report of the electroencephalogram is as follows: "Low voltage electroencephalogram with some 9-11 per second activity. No focal abnormality. No seizure discharges. Big build-up with over-ventilation. Normal EEG for age. No evidence of damage or epileptiform activity in the accessible cortex." The spinal serology was normal. An x-ray of the skull reveals a skull of normal configuration and density. The vascular markings are normal. The pineal body is not calcified. The sella turcica is normal in size and configuration. There is no evidence of fracture or other pathology. The frontal sinuses are heavily calcified, though reasonably well pneumatized. The impression is a normal skull. X-rays of the lateral, anterior and posterior positions of the spine revealed no evidence of trauma or disease in the cervical, thoracic or lumbar spine. The flat plate of the abdomen revealed no foreign bodies.

#### *Psychologist's Report*

William Heirens was submitted to a series of carefully selected and conducted psychological tests, calculated to reveal trends, both conscious and underlying consciousness.

The quality of intellect was carefully tested and he was found to have an intelli-

gence quotient of 110—an average figure. He was cooperative, readily understood instructions, attempted all items offered, and answered questions freely.

On none of the psychological tests was there any indication of a psychosis or of malingering.

On personality questionnaires he was found to be outgoing and dominant with a lack of self-consciousness or feelings of inferiority. It must be remembered, however, that these questionnaires represent the subject's own evaluation of himself and may not necessarily conform with his actual behavior.

An evaluation of all the psychological techniques used, indicated a definite emotional insensitivity and instability severe enough to be considered abnormal, as well as a blunting of moral concepts.

The majority of tests tend to suggest hysteria.

We regret the lengthiness of this report; it represents, however, only a fraction of our total material. We believe that it conveys the reasons for the opinion expressed at the beginning of our statement; that William Heirens is not suffering from any psychosis nor mental retardation; that he has a deep sexual perversion and is as emotionally insensitive within, as he is incapable of feeling pain without. He is unstable, and hysterically unpredictable, and most of his actions can be swayed from time to time by the suggestions coming from his environment.

#### *Legal Disposition*

On September 4, 1946 William Heirens was arraigned in the Criminal Court of Cook County on Indictments 46-1465 to 46-1493 inclusive, and 46-1593, 46-1594 and 46-1654. He pleaded guilty to thirty of the charges and on September 5, 1946 received sentences on 24 burglaries of 1-year to life, to run concurrently; on 3 murders, natural life, to run consecutively; 1 robbery, 1-20 years to run consecutively; 1 burglary, 1-year to life to run consecutively; 1 assault to commit murder, 1-14 years to run consecutively. He was delivered to the Department of Public Safety of the State of Illinois at Stateville, Illinois on September 6, 1946.

## CONTROL OF COMMUNICABLE DISEASE IN A LARGE MENTAL HOSPITAL<sup>1</sup>

T. K. GRUBER, M. D., AND S. E. GOULD, M. D., ELOISE, MICH.

Problems in the control of communicable disease in mental hospitals are of concern to all medical and non-medical officers who are directly or indirectly charged with the care of patients in such institutions. Because of this responsibility, it may be useful to outline the experiences and practices of a large county mental and general hospital.

The Wayne County General Hospital and Infirmary is located at Eloise, Michigan, in the County of Wayne, the County in which the City of Detroit is situated. The institution is composed of (1) a general hospital, having approximately 1200 patients with an intern and resident staff numbering 52; (2) an infirmary, having about 1500 patients, whose medical care is in charge of the general hospital staff; and (3) a psychiatric division, of approximately 4000 patients, with a staff of 23 psychiatrists. The total number of employees is over 1800. The total number of patients in the past has exceeded 10,000.

Psychiatric patients are hospitalized in ten buildings, the capacities of which vary from 350 to 1000 beds. Except for patients who require isolation in private rooms, patients are cared for generally in large wards, each ward having a capacity of from 30 to 100 beds. The patients in the institution have various types of psychoses.

*Physical Examination.*—Each new employee is given a complete physical examination, including a blood test and urinalysis, is required to submit a specimen of stool and to have an X-ray examination of the chest. Specimens of stool are examined for blood, parasites, and pathogenic bacteria. The same examinations are made on each patient upon admittance, except that fluoroscopy of the chest is substituted for roentgen films.

*Immunization Against Smallpox, Typhoid Fever and Diphtheria.*—Each new patient

and new employee is immunized against smallpox, typhoid fever, and diphtheria unless he has had active infection with the respective disease, or has been immunized against that disease within the preceding 5 years and can produce a medical certificate to that effect.

Immunization against typhoid fever is accomplished by subcutaneous inoculation with 0.25 cc. of typhoid vaccine (1 billion organisms per cc.), and two subsequent inoculations of 0.5 cc. each at weekly intervals. If typhoid vaccine has been administered during the preceding year, a single "booster" dose of 0.1 cc. is given intradermally. After admittance, while the patient remains in the hospital, he is given such an additional dose intradermally each year. The need for immunization against typhoid fever was made apparent in 1936 when a fatal case of typhoid fever was discovered in a mental patient who had not been outside of the institution for some years previously. She was diagnosed as having typhoid fever clinically, and her death was due to peritonitis which followed perforation of a typhoidal ulcer of the lower ileum.

A single inoculation of smallpox vaccine is given to persons having an old smallpox scar. The inoculation is repeated, if the vaccination does not "take," in persons who do not have a scar of an old vaccination. Whenever there is danger of an epidemic of smallpox in the City of Detroit or elsewhere in the county, all employees and patients in the institution are required to submit to such an inoculation. In performing vaccination, the site of inoculation is not cleaned with alcohol, but only with soap and water. Alcohol cleansing inhibits approximately 50 per cent of vaccinations. Each employee and each patient is given a Schick test. Persons having a positive test are inoculated with 3 doses of 1 cc. each of diphtheria toxin-antitoxin at weekly intervals. Formerly a single inoculation of alum toxoid was used but was discontinued on account of some severe reac-

<sup>1</sup> Read at the 102nd annual meeting of The American Psychiatric Association, Chicago, Ill., May 27-30, 1946.

From the Wayne County General Hospital and Infirmary, Eloise, Mich.

tions. It is planned to substitute fluid toxoid as soon as it becomes available. With this material, as with alum toxoid, only one immunizing dose is required.

*Control of Tuberculosis.*—The incidence of pulmonary tuberculosis in mental hospitals is generally higher than in the general population in the areas from which patients are received. In 1935 at Eloise there were 38 autopsies performed on patients dying in the mental hospital. Eight of these patients, or 21 percent, were found to have died of pulmonary tuberculosis. In an effort to control the spread of tuberculosis in the wards of the mental hospital, a survey of case finding of the disease among patients in the institution was begun in 1936 by Altshuler and Bailey(1), and completed in 1940 by Hoffmann and Bailey(3). The Mantoux tuberculin test was used as the first screening method to eliminate nonreactors from those requiring subsequent X-ray examinations of the chest for the possible presence of the disease. Three thousand, two hundred and eleven patients or employees were so tested. Of this number, 82 percent were reactors who required subsequent X-ray examination of the lungs. Since there were only 18 percent of patients with negative skin readings, the tuberculin test was discarded as a screening test. It is interesting to note that of 447 patients who were tested upon admittance, only 49 percent gave a positive tuberculin reaction, whereas of 2410 patients who had already been hospitalized, 88 percent gave reactions. These figures suggest that patients who are admitted without infection become exposed to the infection while in the institution.

In place of the tuberculin test, it was found feasible to take X-ray films of the chest of each employee entering hospital service and to make a fluoroscopic examination of the chest of each patient upon admittance, and thereafter to repeat such examinations once yearly. Patients found to have positive or questionable evidence of pulmonary disease upon fluoroscopy were subjected to stereoscopic X-ray examinations of the chest. The diagnosis was based upon the findings in the roentgenograms. Routine X-ray films of all patients were not taken because of the large cost and the ex-

cessive amount of work which would have been entailed by such a program. It was realized, and later demonstrated, that the fluoroscopic method of screening missed some patients with tuberculous lesions.

During the survey, 4477 patients were examined and 276 were found to be tuberculous (6.2 percent); while 1200 employees were examined and 42 were found to be tuberculous (3.5 percent).

Altshuler and Bailey found that of the patients who were tuberculous, only 1.8 percent had been hospitalized less than one year, while 66 percent had been hospitalized five years or more. It was also found that the type of mental disease was not related to the frequency with which tuberculosis was contracted, except insofar as the type of mental disease affected the length of hospitalization.

As the survey progressed, patients found to have pulmonary tuberculosis were isolated in special wards for observation and treatment. Since these special wards for the care of tuberculous mental patients have been established at Eloise, the hospital has been receiving from other hospitals in Wayne County, patients with tuberculosis who develop psychosis in the course of a pulmonary infection. These wards are fully equipped for general physical examinations and medical treatment, and are provided with fluoroscopic units and apparatus for the production of pneumothorax. At the present time there are approximately 200 mental patients under treatment for tuberculosis in these wards. About one-third of the tuberculous patients are female and two-thirds are male, while of the total number of mental patients in the institution 54 percent are female and 46 percent are male.

*Examination of Water Supply.*—The water supply comes from the City of Detroit and travels approximately 17 miles from the purification plant before reaching the institution. Bacteriologic examinations of the water are made in the hospital laboratory each day except Sunday. These examinations are made to obviate the possibility of infection seeping into the water system by suction from leakage of water mains or by back siphonage before or after the water reaches the institution. The bacteriologic examination of water includes that of a large water

reservoir having a capacity of 1,500,000 gallons, which the hospital maintains in case of a sudden disruption of its source of water supply from the city. This reservoir "floats" on the intake supply line to prevent stagnation. The hospital uses an average of 1,000,000 gallons of water per day.

In order to prevent the possibility of spread of disease through contaminated water by back siphonage into the inlet pipes, it is important to inspect all plumbing periodically and to correct all defects in the water system. Vacuum-breakers have been installed on all toilets and other fixtures, and no faucet is allowed to extend within three-fourths of an inch of the highest possible water level of any sink, tub or water basin. It is obvious that disease spread through the water system may reach epidemic proportions and may be catastrophic in its effects.

*Examination of Milk Supply.*—The hospital receives its milk supply from two sources: (1) a herd of about 125 cows which is owned by the hospital and maintained on the hospital farm, and (2) milk that is purchased.

In 1935 and 1936, milk used in the institution was not pasteurized. During these two years, a survey of the incidence of brucellosis in the institution was conducted by Gould and Huddleson (2). It was found that 10 percent of the herd maintained by the institution, and 14 percent of the cows in the herd, showed a significant agglutinating titer in the blood for Bang's disease. There were 8124 patients and employees who were skin-tested with an extract of brucella organisms and 10 percent gave a positive intradermal reaction, indicating past exposure and sensitization to the organism of undulant fever. Of the 2394 mental patients tested, 15.4 percent gave a positive skin reaction. It was believed that mental patients showed a higher percentage of brucella sensitization because they had consumed unpasteurized milk for longer periods than had the employees or other groups of patients tested.

During the course of the survey there were 6 persons found to have active brucellosis, all of whom recovered. Following examination of the blood of the cattle for evidence of infection, all brucella reactors were isolated and the milk of infected cows was boiled or used only for cooking purposes.

As a result of the survey among patients and employees, a modern pasteurization plant was constructed on the premises and all milk, unless previously pasteurized, is subjected to such treatment. Since 1937, all milk which is produced on the premises, or which is purchased, is subjected to daily bacteriologic examination to insure its safety for human consumption.

*Control of Insect Pests.*—Measures which are used to control insect pests include adequate screening of windows and doors to exclude flies and mosquitoes; now, of course, periodic spraying with DDT powders or liquids about water inlets and other harboring places, as indicated, to control roaches; and periodic fumigation of mattresses with carbon tetrachloride for destruction of bedbugs. The chamber which is used for fumigation of mattresses is simple, inexpensive and highly effective, and is recommended for use by all hospitals, hotels and similar institutions. Mattresses and beds are also now sprayed with DDT to eradicate bedbugs.

*Control of Outbreaks of Gastro-Enteritis.*—It is estimated that, of the 1800 employees in the institution, about 1000 employees are connected directly or indirectly with handling of food. In addition, there are about 500 non-paid workers in the institution who also assist in some capacity in the handling of food. The opportunity is therefore great for the spread of gastrointestinal diseases within the institution. Because mental patients are hospitalized in ten different buildings and each building has its own separate kitchen, outbreaks of gastro-enteritis are usually confined to individual buildings. As might be expected in a climate like that of Michigan, outbreaks of gastro-enteritis are more frequent during the summer and autumn months.

Each employee and non-paid inmate helper who assists in any way in the handling of food is required to have a physical examination and an examination of the stool. Foodhandlers are given printed instructions regarding their work, with emphasis on the matter of personal hygiene as it affects the spread of disease through handling of food. Records are kept of the results of physical examinations of foodhandlers and of the examination of their stool. Additional instruction in food handling is given by the Depart-

ment  
tions  
given

The  
acute  
Any  
upset  
media  
to the  
tion.  
simul  
succe  
lated  
the s  
10 or  
break  
team  
assign  
trolli  
assign  
and c  
in th  
occu

Th  
infect  
year  
tery,  
grou  
hosp  
to th  
not  
that  
a m  
robu  
scler  
to s  
resu  
and  
outl  
men  
ods  
an  
the  
Fle  
gua  
dist  
bre

ment of Cuisine. Lectures and demonstrations on matters of health and sanitation are given by medical officers and bacteriologists.

The method of isolation of patients with acute gastro-enteritis may be of interest. Any patient who develops a gastro-intestinal upset with vomiting or with diarrhea is immediately isolated and a stool specimen sent to the laboratory for bacteriologic examination. If several patients become infected simultaneously or if their infections occur successively at short intervals, they are isolated and precautions are taken to control the spread of the infection. If a group of 10 or more patients are affected in an outbreak of gastro-intestinal disease, a special team of doctors, nurses and attendants are assigned to the task of studying and controlling the outbreak. Two nurses are then assigned to check on the washing of hands and cleaning of fingernails of all foodhandlers in the building where the outbreak has occurred.

The most frequent and important type of infection encountered during the past 15 years has been the group of bacillary dysentery, caused by the *Shigella*-*Salmonella* group of bacteria. It is to be expected that hospitalized patients who have been confined to the institution for a number of years will not be in the best of physical condition and that gastro-intestinal infections will produce a more severe effect upon them than upon robust healthy individuals. Old arteriosclerotic and cardiac patients are more likely to succumb to an infection of this type as a result of rapid dehydration and exhaustion, and, sometimes of toxemia. Several of these outbreaks have furnished the medical department with the opportunity for studying methods of treatment. Thus, Smyth *et al.* (4), in an outbreak of acute bacillary dysentery of the Flexner variety (*Shigella dysenteriae*, Flexner) in 1942, found that both sulfaguanidine and succinylsulfathiazole were of distinct value in treatment. In a recent outbreak in 1945 of gastro-enteritis, *Shigella*

*sonnei* was isolated from the stool of 41 patients or attendants. This infection was believed to have been brought into the institution from neighboring communities. Patients were treated experimentally with streptomycin. Stool examinations were made of approximately 1000 patients and attendants. Incidentally, during this examination four typhoid carriers were found among patients. These carriers were isolated and three of the patients were subjected to cholecystectomy. The fourth carrier was too old to risk surgical operation. Another patient was found to be a carrier of *Shigella parady-senteriae*, variety Boyd 103. In another building, 6 patients were found to have *Shigella dysenteriae*, variety Flexner Z.

The important point to be stressed in this discussion is that infectious diseases should not be allowed to spread in a mental hospital. Modern health standards require that every practical device known for the control of communicable diseases must be applied.

The average mental hospital is a self-contained community, perhaps as large as the average town in the United States. For the proper control of communicable disease, each mental hospital should have the equivalent of a well operated health department, employing the most modern technics. It is recommended that the operation of such a health department should be entrusted to a qualified full-time health officer, under the direction of the pathologist of the institution.

#### BIBLIOGRAPHY

1. Altshuler, S. S., and Bailey, L. J. Control of tuberculosis in an institution for the mentally ill. *Am. Rev. Tuberc.*, **44**: 335, 1941.
2. Gould, S. E., and Huddleson, I. F. Diagnostic methods in undulant fever (brucellosis), with results of a survey of 8,124 patients. *J. A. M. A.*, **109**: 1971, 1937.
3. Hoffmann, M. H., and Bailey, L. J. A tuberculosis case-finding program in the mental hospital. *Dis. Nerv. Sys.*, **A**: 2, 1943.
4. Smyth, C. J., Finkelstein, M. B., Gould, S. E., Koppa, T. M., and Leeder, F. S. Acute bacillary dysentery (Flexner). *J. A. M. A.*, **121**: 1325, 1943.

# THE IMPORTANCE OF THE EMOTIONAL FACTOR IN THE CONVULSIVE DISORDERS OF CHILDREN<sup>1</sup>

## (A PRELIMINARY REPORT)

REYNOLD A. JENSEN, M.D., MINNEAPOLIS, MINN.

One of the most important findings which has emerged from researches on the convulsive disorders is the multiplicity of causes(1, 2, 3). Among the many mentioned are disturbed emotional states, though they are not regarded as primary. As early as 1885 Gowers(4), discussing the exciting causes of epilepsy, mentions "of all the immediate causes the most potent are psychical—fright, excitement, anxiety." He attributed importance to acute emotional disturbances in one-seventh of a series of 1,150 cases studied. He also suggested that prolonged anxiety is an important influence in the course of the disease. Lennox and Cobb(5) state "psychological factors in epilepsy are important." Campbell(6) Fremont-Smith(7, 8) Rose and Bond(9) and Clark(10) have reported the direct relationship between emotional tension and seizures. Other papers have been abstracted by Dunbar(11).

Our interest in the importance of the emotional factors in convulsive disorders in children developed out of observation of patients with this complaint admitted to the department of pediatrics of the University of Minnesota Hospitals. We noted a lessening or cessation of their seizure states, both in frequency and severity, during hospital stay. Cobb's(12) report emphasizing the advantages of the psychiatric approach to the treatment of patients suffering from epilepsy stimulated us to observe and evaluate more critically tension-producing factors and the emotional reaction to them.

In the belief that childhood offers many advantages for such study and that a real need exists to investigate further this little-explored area, this preliminary paper devoted exclusively to children briefly reports our findings in 22 cases. Two adolescents referred to us for other reasons, but who had

had convulsions in the past, are included as they serve to illustrate the importance of severe acute emotional trauma.

In this series 12 were girls and 10 were boys. Ages ranged from 2 to 16 years. The duration of seizures from the onset varied from 6 weeks to 10 years, the majority occurring within 2 years prior to referral. All types of seizures were represented. An aura was reported by 7 patients. Frequency varied from one isolated seizure of the grand mal type to 20 or 30 daily petit mal spells at the time of the referral. Fifteen of the patients were hospitalized; the remaining 7 were followed on an outpatient basis.

Study of each patient included the following: (1) a careful history with particular attention to the hereditary, birth, developmental, health and family history; (2) thorough physical and neurological examination and basic laboratory study with special studies when necessary (at the time these patients were under observation we did not have the advantage of electroencephalography); (3) careful basic psychological testing when indicated; (4) repeated interviews with the parents and patients when possible to determine (a) general family organization, attitudes and relationships, (b) unusual stresses and strains present within the family structure, (c) worries and conflicts which the patients themselves had.

In illustration we cite four case histories.

1. "A," female, age 3, was admitted to hospital for study of "spells" present since age 1 year and 3 months. The referring physician described them as "several during the day—patient stiffens out—focuses eyes on distant objects and falls into convulsive tremor." His physical and neurological examination were negative. Phenobarbital and calcium therapy were ineffective.

Birth, health, developmental and family history was reported negative. Patient was born out of wedlock and placed in her first foster home early in infancy where these spells began. The foster parents were deeply attached to our patient. Because of "over-stimulation" on their part she was replaced in a second foster home where spells promptly ceased. They recurred when replacement

<sup>1</sup> Read at the 102nd annual meeting of The American Psychiatric Association, Chicago, Ill., May 27-30, 1946.

From the Departments of Pediatrics and Psychiatry, University of Minnesota Medical School.

in a thi  
having f  
when ad  
Physic  
studies  
and pitr  
was high  
following  
her 28-d  
A poc  
pital pre  
increase  
develop  
began st  
sleeping  
develop  
Repla  
—broug  
other sy  
was pre  
readily  
of all p  
used at

2. "B"  
1940, fo  
one to t  
These s  
in her

Preg  
family  
rologic  
enceph

Foll  
daily)  
was ad  
tinued  
capsule  
all me  
dischar  
work  
friendl  
time  
mother  
brothe  
person  
of ina

In C  
fused  
pediat  
she bu  
vulsio  
family  
frequ

The  
was l  
she b  
Caref  
condi

Ag  
great  
scrib  
stron  
youn  
She  
she  
learn  
the b

in a third foster home was necessary. She was having from 7 to 10 seizures (*petit mal*) daily when admitted to the hospital.

Physical, neurological and special laboratory studies (routine blood, urine, spinal fluid, x-rays and pitressin test) were negative. Her intelligence was high average. Except for a few mild seizures following hospitalization, none was observed during her 28-day stay.

A poor placement following discharge from hospital precipitated a recurrence of her spells with an increase in frequency and severity. In addition, she developed many fears, bit her lips and fingers and began stumbling about awkwardly. Her eating and sleeping habits were totally disorganized and she developed a stubborn cystitis.

Replacement in an excellent foster home—her fifth—brought a gradual cessation of her spells and other symptoms. Following this improvement she was prepared for a permanent placement which she readily accepted. For 6 years she has remained free of all previous symptoms. No drug therapy was used at any time during our study of her.

2. "B," female, age 9, was admitted October, 1940, for study of her "spells" which had occurred one to three times nightly for the preceding 6 weeks. These spells were of the tonic-clonic type beginning in her left arm and becoming generalized.

Pregnancy, birth, developmental, health and family medical history was negative. Physical, neurological and special procedures, including pneumoencephalogram, were likewise negative.

Following placement on water restriction (900 cc. daily) with no lessening of her seizures, dilantin was administered. Spells promptly ceased. She continued free from spells when sodium bicarbonate capsules were substituted. No spells recurred when all medical treatment was discontinued. She was discharged in December 1940, after an attempt to work with her in psychiatric interviews. While friendly, she resented our efforts. However, at this time she indicated a strong attachment to her mother and an unusual antagonism to her younger brother. Despite a superior intelligence (I.Q. 133), personality inventories suggested marked feelings of inadequacy and inferiority.

In October 1941, her spells recurred. As she refused hospitalization, she was interviewed in the pediatric outpatient department. On one occasion she burst out, "Why do I have to start having convulsions every time there is a new baby in the family?" Phenobarbital and dilantin decreased the frequency and severity of the spells.

Three months later she was re-admitted as she was having 4 or 5 spells each night during which she bit her tongue and sometimes soiled the bed. Careful re-check of her physical and neurological condition was negative.

Again psychiatric interviews were tried with greater success. With the use of play technique described by Conn(13), she began discussing her strong attachment to her mother, her hatred of her younger brother and her fear of hospitalization. She was afraid her mother would not love her if she remained away too long. It was then we learned that her initial seizures came on soon after the birth of the fourth child in the family and re-

curred when the fifth was born. It seemed that each successive birth represented a threat of displacement in the affection of her mother. As we were able to relieve her anxiety by working with her as well as her mother in psychiatric interviews, she began to improve. She was discharged on no medication. Approximately 2 years later during another period of exaggerated tension she returned. Because she resisted psychiatric interviews, she was placed on dilantin and followed in our outpatient department. Within the year her spells ceased and medication was discontinued. She has remained free from seizures for over 3 years.

3. "C," male, 12 years, committed to the State Colony for Epileptics (7-18-39) as a potentially dangerous epileptic, was referred for study before placement. In addition to his convulsive seizures, he stuttered, had violent temper tantrums and did poorly in school.

His first seizure was observed in December 1936 at the age of 9. Seizures were typical of the grand mal type with exception of loss of sphincter control. Attacks were usually preceded by severe frontal headaches and followed by deep sleep.

"C" was delivered after a normal full-term pregnancy by instrument after a 24-hour labor. Resuscitation was reported difficult. With the exception of a mastoid infection at age 7 years, persistent enuresis and a fall from a truck at age 9, he was considered a healthy lad.

Admitted to hospital 11-39 he had only one observed mild seizure during a 68-day stay. This occurred the day following admission after a visit with his mother. Physical, neurological and all special studies including pneumoencephalography and the pitressin test were negative. His behavior early during hospital stay was erratic. Though it improved, he became unmanageable requiring isolation the day prior to discharge. For the following several months he lived in a children's home, adjusting fairly well. Here a few mild (*petit mal*) seizures occurred. At no time did he have any medication.

During his hospital stay he, as well as his parents and the paternal grandparents, was seen in psychiatric interviews. Briefly the background was defined as follows: "C" was the second of 5 siblings. Family life had never been happy due to parental friction, augmented by interference of relatives. The father, age 38, an attractive pleasant-appearing person continued to be dependent upon the paternal grandmother. He was alcoholic, unable to assume any responsibility, and was known "to run about with other women." The mother, age 37, was a tense, nervous, highstrung woman who "went to pieces" when she learned her husband had applied for divorce. Contrary to our patient's wishes, the mother was granted custody of all the children when divorce was finally settled. It was necessary for the mother to work to supplement the alimony granted.

Mother reported "C" different from her other children and found him difficult to manage. Her comment that she "ignored him until he became unbearable and then spanked him" strongly suggested an unconscious rejection of him. His severe temper

tantrums, cruelty to his siblings, obstreperous behavior toward his mother and her family made life in the home miserable. To make matters worse paternal grandparents favored "C."

During our interviews with him he was usually friendly and spoke spontaneously of the frictions in his home. He openly denounced his mother and siblings, acknowledged fantasizing freely about death of his mother and related terrifying night dreams. He thoroughly disliked school and wanted to live on the farm with the paternal grandparents. He often wept as he told his story. His stuttering became worse during his discussion of these troublesome problems.

It was possible for us to arrange for his placement with the paternal grandparents. With the exception of a short interval when he was difficult to manage, he did well. Due to the grandmother's illness, he went to live with his father, where he had no supervision. His seizures recurred and he became a difficult social problem. His seizures ceased for the following 9 months after return to the home of his grandparents. In 1942, when illness recurred in the grandparents' home, his seizures reappeared and this time it became essential to institutionalize him as medication was ineffectual in the control of his seizures.

4. "D," male, 16 years, was referred to our hospital for vocational advice due to school failure. Since the age of ten he had had convulsive seizures diagnosed "idiopathic epilepsy." In addition, he had many petit mal spells—16 to 20 daily. Thorough physical studies at age 12 were reported negative. Vigorous anti-convulsant therapy modified seizures moderately.

He was a full-term infant, born spontaneously after a 26-hour labor. He was cyanotic at birth and did not cry for 20 minutes after delivery. As he became cyanotic again a few hours later, he was placed in an incubator and kept there for 3 days. Except for a fall, which occurred at the age of 6, after which he was dazed and vomited, health history was negative until the onset of his seizures at age 10 years.

Following failure to pass the fifth grade at the age of 10 years, he earned an I. Q. of 79 on the Stanford-Binet test and was considered of borderline intelligence.

At the time of referral, he was virtually a recluse, with no friends, no interests or ambitions and thoroughly discouraged.

"D," the oldest of 5 siblings, had always had trouble in school. His father, an aggressive, "self-made" man, had become a leader in his community. Hoping his son would achieve in school, he was much chagrined over the lad's school failure. Though not overtly admitting his disappointment, he considered his son a total loss. The mother, a quiet, stable, intelligent woman, seemed to have a good understanding of her son's problem. Tension was intense between our patient and the other siblings as they gradually surpassed him in school.

At the time of our study physical examination was negative.

Recheck of his intellectual status revealed a scatter in his I. Q. performance from 78 to 117. A

careful study of his successes and failures on these tests strongly suggested a specific reading disability which was verified.

He responded nicely to interest taken in him. Arrangements were made to tutor him privately for correction of his reading disability. The parents were encouraged to decrease their domination of him and give him increasing responsibility, which included the acquiring of a part-time job.

Coincident with this program his seizures were substantially reduced in frequency and severity. In the course of the succeeding months he had only 3 grand mal seizures, associated either with fatigue or increase in emotional tension. Petit mal attacks ceased.

#### HEREDITY

In 3 cases, all girls, a history of convulsive disorders in one parent was encountered. One mother had had "spells" early in life which had decreased as she matured. One father, age 53, had had seizures of the grand mal type for five years prior to the onset of convulsions in our patient. The father of another had been a known epileptic for many years. No other significant family medical history was obtained.

#### BIRTH AND DEVELOPMENTAL HISTORY

As far as could be determined the pregnancy, delivery, health and developmental history was negative in all but 3 patients. Two patients required resuscitation following difficult delivery. Another patient required placement in an incubator for 3 days because of extreme cyanosis.

#### PHYSICAL STUDIES

Physical examinations were generally negative.

With the exception of one patient who developed a bilateral strabismus following a severe seizure in early infancy, neurological examinations were non-contributory.

Laboratory studies, including x-rays of skulls and pneumo-encephalograms when indicated, offered little in the way of explaining the seizures.

Of the 6 patients who had the McQuarrie pitressin test, convulsions were induced in only 2 patients. One patient, a congenital luetic, had a positive blood Wassermann.

Surgical exploration (craniotomy) was undertaken in one patient who had typical Jacksonian seizures. Nothing significant was observed at operation.

## PSYCHOLOGICAL TESTING

Where indicated, psychological, school achievement and tests of special abilities and disabilities were carried out. Test scores varied from 77 to 133, with the majority falling well within the average range of "normal" intelligence. Bilingualism was encountered in one case, which may have penalized this patient in school performance.

Two cases of specific reading disability were found. One patient was to have been in the eighth grade in school, but, because of his reading deficiency, school achievement test revealed that he was functioning at the level of grade 2 and 3 in reading and arithmetic. This boy, utterly discouraged by school failure, said repeatedly, "I'm just dumb, I guess." The convulsions of another boy, age 15, who had been trying to get through the eighth grade, but was functioning at the level of grade 5 in reading occurred at the time he began failing in school.

## FAMILY ORGANIZATION—HOME LIFE, BACKGROUNDS AND ATTITUDES

In the belief that home conditions are important in a child's life, an attempt has been made to classify, though perhaps crudely, the actual situation which the children in our series faced. The summary is below.

## SUMMARY OF HOME BACKGROUNDS

1. Patients living at home with both parents .....	12
a. Definite tension existing in home .....	10
b. No discernible tension in home .....	2
2. Patients from broken homes....	10
a. Illegitimate .....	2
b. Mother dead .....	2
c. Father dead .....	1
d. Parents separated or divorced. .	5

Marked intrafamily tension existed in the homes of 10 of the 12 children living at home with both parents. Several examples will serve to illustrate. Marked parental conflict was noted in the home of one patient where both parents were unstable emotionally. The mother, the dominant parent, felt much superior to the father, who was a weak, submissive person. In addition, the mother candidly acknowledged, during one interview, that she resented becoming

pregnant with our patient and had always thoroughly disliked him.

Still another patient was overtly rejected by her emotionally immature mother whose guilt over the premarital pregnancy persisted. Though this was the basic factor in the situation, home tension was sustained by poor marital adjustment, constant fear of pregnancy and financial worries.

Five of the children coming from broken homes were living with one parent. Each of these families continued to suffer from marked intrafamily tension apart from the breaking up of the original home. We have cited the situation of patient "C" who thoroughly hated his mother and siblings.

Two of the children were born out of wedlock. One of these we have cited in our illustrations. The other patient, age 15, had been in a foster home, believing it to be his real home. At age 13 he was terrifically upset when, in a fit of anger, his foster mother told him he was not her child and she really had no responsibility for him. From this point on, he became extremely difficult to manage which resulted in increased punishment of him by the foster parents. According to his own story his first seizure followed a severe beating.

The parents of 8 patients exhibited marked anxiety and overprotectiveness, permitting little opportunity for spontaneity on the part of the child himself. Outright rejection of the children on the part of one or both parents was noted in 8 homes.

Intense sibling rivalry seemed significant in 11 patients. For example, one mother stated spontaneously in interviews that her daughter would "pick on her little sister," inviting parental interference and punishment. Following this the patient would have a seizure. Intense jealousy toward siblings who were achieving more adequately in school was noted in several patients. Real hatred of other siblings was found in 6 of our patients. Two of these so thoroughly hated their older siblings that they attempted to do them bodily harm.

A close relationship between the onset of seizures and an experience heavily charged with emotion seems apparent in 11 cases. Severe anger growing out of quarrels preceded the first seizure in 3 of our patients.

Fright seems to have been important in 3 patients. Spells began in one patient after a fall which frightened not only the patient but the parents as well. Another, who was in a correctional institution, developed his first grand mal seizure shortly after receiving word that his mother had been killed. The mother of still another patient definitely stated that fright associated with an appendectomy was important. A combination of anger, hostility and deep-seated hate seems to be important in a patient whose spell followed a severe beating which he had received from the man whom he had thought was his own father, but who in reality was his foster father.

The patient who had only one grand mal spell of 15 to 20 minutes' duration presents an interesting history. This boy was having difficulty with his father—the two violently disliked each other. During one of their frequent periods of hostility, a very close friend of his died suddenly. The morning of the memorial service a violent quarrel with the father occurred. Our patient ate no breakfast or lunch. His grief was intense during the memorial service and continued for several hours thereafter. Finally, realizing how hungry he was, he had an ice cream soda at the corner drugstore. A few moments later he had his fit on the street which lasted approximately 20 minutes. This is the only seizure this boy has had.

Another patient likewise presents an interesting sequence of events. At the age of 12 years she was admitted to the hospital because of the sudden onset of seizures so severe it was necessary, in the opinion of the local physician, to administer ether to control them. Her spells developed the evening of the day a state social agency had assumed custody of the children in her family, including herself. She has never accepted this action on the part of the state authorities. Though she has not had a recurrence of her seizures, she did develop finally a severe psychiatric problem of the hysterical type.

As a group these patients responded most readily to an interest in them, their worries and feelings about themselves and others. Early traumatic experiences, disturbing dreams, dread of failure in school, feelings about home, parents and siblings were freely related in the majority of in-

stances. One patient with a bilateral squint told of the ridicule she suffered at school, "They call me 'cross eyes.' I'll hit them so hard they'll get them and then they'll know how it feels." Another patient repeatedly emphasized, "They (her younger brothers) make me so nervous." She quickly added that she wished they lived elsewhere. Still another patient told how he hated his younger siblings, "They make me so mad I hit them." During periods of uncontrollable rage this boy had taken after his mother with a knife.

Disturbing dreams were present in nearly every case. The majority of them suggested the prevalence of marked anxiety, hostility and insecurity. Dreams of falling, of being pursued by fierce animals or in some instances grotesque adults were most common. Several of our patients were outspoken in the expression of hostility and resentment toward their parents and other members of their families.

The majority of these patients improved as they shared their worries and conflicts. Our most outstanding success was a young lad who showed immediate improvement following free discussion of the difficulties which his mother and father were having at home.

Five of the 15 patients who were hospitalized had no observed spells at any time during hospitalization. Though only 4 of the remainder continued having seizures while in hospital, their spells did not occur as frequently nor were they as severe as prior to admission. Cessation of seizures occurred in 4 of these 10 patients without the use of medication.

In our 22 cases 10 have continued to remain free from seizures. Six continue to have spells though these are less frequent and less severe than prior to study. It was necessary to institutionalize the remaining 6 all of whom came from the most difficult and unmodifiable situations.

Cobb's (14) suggestion of "finding several causes and giving to each its proper emphasis" seems well illustrated in this series. The inclusion of psychotherapy should in no way militate against the use of anti-convulsant drug therapy, water restriction or dietary measures; all should be used as indicated. For Bowlby (15) has rightfully

stressed, "It is often exceedingly difficult to distinguish between epilepsy and hysterical fits." He further suggests "There is no true line dividing the two conditions although modern methods of electroencephalography do seem to be establishing a difference. Moreover there is no sound reason for regarding idiopathic epilepsy as organic in distinction to hysteria which is psychogenic. Many cases could be cited where fits have followed an emotional shock whilst their relation to repressed hatred is obvious, one child having a fit where another would get into a rage." Kraines(16) and Campbell(6) have emphasized the importance of habit formation in the convulsive disorders. Each seizure makes easier the occurrence of another.

If every physician dealing with the convulsive disorders of all age ranges, but particularly children, could be encouraged to consider and to deal constructively with the situational and emotional factors early in each case, we are sure much could be done to ease subsequent care of these patients and their families.

#### BIBLIOGRAPHY

1. Lennox, W. F. A view of epilepsy after ten years of research. *J. Nerv. and Ment. Dis.*, **77**: 504-6, 1933.
2. Lennox, W. F. Science and seizures. Harpers & Bros., New York, 1941, pp. 63-73.
3. Cobb, S. Causes of epilepsy. *Arch. Neur. and Psych.*, **27**: 1245-56, 1932.
4. Gowers, W. O. R. Epilepsy and other chronic convulsive disorders. William Wood & Co., New York, 1885, pp. 19-21.
5. Lennox, W. G., and Cobb, S. Epilepsy. *Medicine Monograph*, vol. 14. Williams and Wilkins Co., Baltimore, 1928, pp. 42-3.
6. Campbell, M. On the mechanism of convulsive phenomena and allied symptoms, studies in psychiatry, vol. II. *Nerv. and Men. Dis. Pub. Co.*, New York and Wash., 1925, pp. 49-58.
7. Fremont-Smith, F. The influence of emotions in precipitating convulsions. *J. Nerv. and Ment. Dis.*, **77**: 506-8, 1933.
8. Fremont-Smith, F. The influence of emotions in precipitating convulsions. *Am. J. Psychiat.*, 1934.
9. Rose, R. G., and Bond, W. E. Epilepsy a functional mental illness and its treatment. Paul B. Hoeber, Inc., New York, 1926.
10. Clark, L. P. Psychology of essential epilepsy. *J. Nerv. and Ment. Dis.*, **63**: 575-85, 1926.
11. Dunbar, H. F. Emotions and bodily changes, 2d ed. Columbia Univ. Press, New York, 1938, pp. 125-127.
12. Cobb, S. Psychiatric approach to the treatment of epilepsy. *Am. J. Psychiat.*, **96**: 1009-1022, 1940.
13. Conn, J. H. The child speaks to the psychiatrist. *Occ. Ther. and Rehab.*, **17**: 231-44, 1928.
14. Cobb, S. Borderlands of psychiatry, Ch. VII. Harvard Univ. Press, 1943, p. 112.
15. Bowlby, J. "Hysteria in children" in a survey of child psychiatry edited by R. G. Gordon. Oxford Press, London, 1929, p. 84.
16. Kraines, S. H. The therapy of the neuroses and psychoses. Lee and Febiger, Philadelphia, 1941, p. 409.

## CASE REPORT

### RELATIONSHIP THERAPY IN A CHILDREN'S PSYCHIATRIC WARD

RUTH GILBERTSON HART, R. N., VAN NUYS, CALIF.

The psychiatric nurse, together with her non-professional associates on the ward, can play a direct psychotherapeutic rôle in cases of acute behavior problems of children by relating herself to the children in such a way as to meet their emotional needs.

The organization and functioning of the children's ward at the Illinois Neuropsychiatric Institute, where work of this kind has been carried on, has been described elsewhere.<sup>1</sup> The present report illustrates the effectiveness of this type of therapy by presenting the case of John whose extreme hyperactivity and destructiveness combined with the handicaps of epilepsy and mental deficiency taxed severely not only the professional but also the personal resources of those who worked with him. The staff had to overcome the feeling of hopelessness usually attached to epilepsy and feeble-mindedness and to recognize that the behavior difficulty could be treated in spite of these other undeniably serious problems. Medication was administered only for the epilepsy; formal psychotherapy was considered impossible and was not attempted. The regimen of the ward which was of therapeutic value for the other children meant nothing to this patient. He began to improve only after he had developed attachments to the nurses and other ward personnel. These relationships partly met his enormous need for love and attention and created the affective milieu within which he was enabled to change in a year's time from a violent, unpredictable little animal to a fairly happy, reasonably tractable little boy.

John was 7 when he was referred to the Juvenile Court by police who on several occasions had found him wandering far from home. The court asked the Institute for Juvenile Research, a state-operated child guidance clinic, to make a study of the case. It learned that John was the second child of poor immigrant parents. The father, characterized

as a brutal person, deserted before John's birth. The mother then formed a relationship with another man by whom she had 4 children. This man was said to have made sexual approaches to the children. The family lived under cramped and squalid conditions; the children were dirty and unsupervised. The mother was described as dull and distraught.

John's birth and early developmental history were uneventful. However, at 20 months when he was hospitalized for infantile diarrhea and pneumonia he was found to be rachitic and malnourished. His first convulsions took place at this time. When hospitalized at the age of 6 for burns sustained during a seizure a diagnosis of ideopathic epilepsy was made. Treatment was sporadic because of the mother's opposition. The severity and frequency of the seizures prevented his attending school. He roamed the streets begging for pennies and collected worthless odds and ends. Sometimes he was extremely affectionate toward members of the family or strangers. He was subject to fits of violent anger. He would exhibit his genitalia, urinate on the floor and break furniture. When his mother did not meet his constant demands for demonstrations of affection he would tear off a finger- or toe-nail.

The Institute for Juvenile Research decided to place John in the ward, of which it is in charge, for further study. He came with his mother and the social worker. He allowed his mother to go but clung desperately to the social worker. He undressed himself for his admission bath, rolled and splashed in the water and allowed the nurse to dress him. He kissed and hugged her, saying, "My mother beats me. Will you live with me and be my mother? Give me lots of marbles and blocks."

According to ward practice, he was placed in isolation. He was given toys and considerable attention to which he responded with affection. But when he was required to go to bed, he pulled off his clothes, ran into the corridor yelling profane insults in two languages. He became so wildly destructive that it was necessary to remove his bed from the room; but later, when the nurse suggested that he help her put it back, he enthusiastically assisted her, got into bed and fell asleep.

During the isolation period he ate ravenously. When left alone he would tear off a toenail with his teeth or thrust a finger down his throat to induce vomiting. He urinated on the floor, stuffed paper into the toilet to make it overflow. He scaled the wall in the corner of his room and for minutes at a time stayed up there, clinging monkey-fashion to the molding with his remarkably prehensile

<sup>1</sup> Am. J. Nursing, June 1943.

The author was assisted by Helen Sutton, R. N. in compiling material for this report.

toes. He took every opportunity to make noise by banging on the walls and the furniture and by slamming doors. He continued to beg, "I am a poor boy. I ain't got no daddy or mama to love me . . . poor Johnnie, mama kiss daddy, daddy kiss mama . . ." He pounced upon and tried to choke a nurse who was instilling medication in his ears which were discharging.

Because it was believed that the continual thwarting necessary to enforce his isolation exaggerated his hyperactivity, John was transferred to the ward before the end of the isolation period. He did not enter any form of group play nor did he ignore the other children. He chased them, performed his tricks for them, jumped into their beds. He tried to insert his fingers into their rectums. He exhibited his genitalia, tried to seize hold of the boys' penises, asked to suck the girls' breasts. He struck other children with any handy object. He beat one patient with a baseball bat. He spat at the nurses, banged on their office doors, stole money from their purses. He rubbed his genitalia against female ward personnel and tried to feel their breasts. In the toilet he masturbated rectally. Following a prolapse of the rectum, he pinched his mucosa until there was profuse bleeding. He would then smear himself and the walls with blood and feces. The wet neutral packs which were administered during the first period following John's release from isolation were necessary not only for sedation but also as a practical means of control. John was clearly the most disturbed and disturbing child on the ward.

The first manifestation of epilepsy, a seizure of the grand mal type, occurred shortly after his hospitalization. In order to determine the type, frequency and rhythm of the seizures, the psychiatrist ordered that no medication be given to control them. Later, phenobarbital brought them under control. Dilantin was subsequently substituted experimentally with poor results and replaced permanently by phenobarbital.

Although feeble-mindedness was suspected from the first, it was not until the eighth month of hospitalization that a psychometric could be done; it indicated a mental age of 4 years.

The treatment plan in this case was the product of frequent conferences between the medical and nursing staffs. The clue to the successful management of John's behavior seemed to be his tremendous craving for affection and his readiness to form attachments. Perhaps he could be helped to develop inner controls through the judicious balancing of indulgence and firmness. This would be similar to the creation of "conscience" in a real family situation. The promise of love and indulgence and the fear of their withdrawal would lead him to choose approved as against unacceptable ways of behaving.

Great resourcefulness, watchfulness, patience and stamina were required to put this plan into effect. Fortunately, it was possible to give this child genuine affection because, despite his extraordinary behavior, he was appealing in appearance and pitiful in his neglect. He wanted love expressed

in direct ways—in lap-sitting, embraces and kisses. Because of his mental backwardness, verbal reproofs needed reinforcement by stern looks, decisive gestures and occasional manual restraint. Constant repetition of punishments and rewards were necessary before a new habit was established.

At all times, John was in someone's exclusive care. Because of the strenuous character of the work with this child, no nurse or attendant could be required to spend more than an hour at a time with him. Even this hour taxed the equanimity of the most patient person, and staff members who became fond of the boy frequently were seized with feelings of revulsion and rejection. That he could give cause for such feelings is attested by the instance of his expectorating into the mouth of an attendant, causing her to vomit. Nurses relieved their tensions by discussing with the psychiatrists and each other their hostility for the boy. Particular problems of management were discussed at regular staff conferences. The supervisors gave ready support and sympathy to the personnel in their attempts to adjust to this difficult situation.

John's first play interest was in dolls. Other children touched one of his collection at the risk of losing a handful of hair. Identifying himself with a baby doll, he remarked as tears ran down his cheeks, "Baby, I like you. I didn't mean to hit you. Mother will spank baby, but I will hang mother on a nail." (One of his complaints against the stepfather was that he had punished him by hanging him on a nail.) He was very clever at catching flies with his hands. He enjoyed the approval he earned when he fed captured flies to the turtles kept in the school room. He was fascinated by the common sounds about him, and he loved to produce strange noises himself. In the playground he took no part in group activities, but he sought attention by making noises and clowning. Laughter at his antics made him delirious with joy.

For a year the ward was his home, and his contacts with members of his family were infrequent. His mother, always harassed by home duties, was pregnant during a major part of the period of John's hospitalization. Her visits were always short. At first he wanted to go home with her, but later seemed content to let her go when a visit was concluded. She was demonstrative toward him in what appeared to be a genuinely affectionate way. She recognized the improvement in his behavior, seemed content to let him stay. The maternal grandmother, an excitable person, produced a sympathetic reaction in John when she came to visit. His father, whom he had never seen, visited him once, just before entering the army. The boy was shy at first but soon was sitting on his father's lap. Later he spoke proudly of his daddy to the other patients.

John greatly enjoyed the praise, affection and approval which were his rewards for acceptable behavior, but when these were withheld he indulged in long periods of forced crying and self-pity. He was willing to be taught new things by people he

liked. He learned to use politer terms for natural functions than those he brought into the ward. His attachment to the kitchen maid whom he often called "mama" was manifested by a willingness to help her with her work. The entrance of another child into the room at this time would arouse his jealousy. He formed a similar attachment to the cleaning maid. He helped her dust the ward and empty the wastebaskets (in which he would search for pennies). He would "make dust" by picking plaster loose from the walls or shredding cigaret butts. He explained: "Dust makes flies and flies are in all mothers' homes." The maid's success with John led to her reclassification as a ward attendant.

When John discontinued his habit of soiling and smearing, he began to show an interest in hand-washing and washing his toys. This produced new problems; he preferred the toilet bowl to the lavatory and he enjoyed flushing the soap down the toilet, resulting in frequent emergency calls to the plumber and a diminution of the soap supply. Locking the bathroom doors prompted him to steal soap and hide it until he could sneak into the bathroom. He was rewarded with pennies when he did not throw soap into the toilet, and after 3 months the trouble abated. Eventually he voluntarily gave up hoarded soap to the nurse or attendant with whom he had had a satisfactory play period.

By the fourth month of John's stay on the ward he was having many quiet days. The neutral packs

were discontinued, firmness on the part of nurses and attendants having become adequate as behavior controls. John showed greater interest in other patients, especially the older girls who sometimes assumed a parental attitude toward him. He cried because he was not permitted to sleep with them in the girl's dormitory.

He was taken on walks with the other children. In exchange for allowing him to run free, he agreed always to wait at the corner for the group to catch up with him. Once he ran off and disappeared. A wide search failed to find him, but 4 hours later he was seen, transfer in hand, waiting for a street car a short distance from the hospital. Very pleased with himself, he explained how he had used his store of pennies to ride the streetcars. He had had no intention of running away; as he transferred from car to car he had always kept the hospital tower in sight.

At the end of a year in the ward, John, although greatly improved, still required expert supervision. It was felt that he would benefit by a longer stay, but war-time staff shortages required his discharge, and he was transferred to a state hospital for the feeble-minded. When, 3 months later, the former ward supervisor of nurses visited him at the state hospital, there was no evidence that he had regressed from his stage of development at the time of discharge from the ward. Not long afterward it was learned that he had been paroled to his mother.

Editor

St  
the c  
pento  
CAN  
in th  
of th  
bral  
The  
In o  
of K  
bloo  
vised  
cerel  
parti

<sup>1</sup> H  
Himw  
anesth  
Psych  
<sup>2</sup> H  
York,  
pento  
J. Ph  
<sup>3</sup> K  
of cer  
oxide  
143:  
<sup>4</sup> K  
Schm  
ment  
evalua  
6: 142

nurses  
behavior  
n other  
metimes  
le cried  
th them

children.  
e agreed  
to catch  
ared. A  
rs later  
a street  
pleased  
used his  
He had  
nsferred  
hospital

although  
ervision.  
ger stay,  
scharge,  
for the  
former  
he state  
had re-  
the time  
fterward  
l to his

## CORRESPONDENCE

Editor, AMERICAN JOURNAL OF PSYCHIATRY:

SIR: We have recently published data on the cerebral metabolic rate before and after pentothal anesthesia on man<sup>1</sup> in the AMERICAN JOURNAL OF PSYCHIATRY and on dog<sup>2</sup> in the *American Journal of Physiology*. One of the factors necessary to determine cerebral metabolic rate is cerebral blood flow. The other is arteriovenous oxygen difference. In our investigations we used the method of Kety and Schmidt<sup>3</sup> to measure cerebral blood flow. Kety *et al.*<sup>4</sup> have recently revised the formula for the calculation of cerebral blood flow for they changed the partition coefficient of nitrous oxide between

brain and blood and reduced its value from 1.3 to 1.0, thus rendering previous results 23% too high. Our results obtained from the venous blood containing the major part of the cortical return are therefore lowered to 3.0 cc O<sub>2</sub>/100 gm tissue/hour and for the blood containing the chief part of the subcortical contribution 2.1 cc O<sub>2</sub>/100 gm tissue/hour yielding an average of 2.5 cc/100 gm tissue/hour for the entire brain. This value is somewhat less than that of 2.8 cc O<sub>2</sub>/100 gm tissue/hour, the corrected average of Kety and Schmidt.<sup>3</sup> Assuming an oxygen intake of 250 cc per minute for the entire body, the fraction used by the brain is 14-16%, a value similar to that obtained by the Evans Blue Method.<sup>5</sup> We measured predominantly the cortical metabolism<sup>2</sup> in the dog with a corrected result of 4.5 cc O<sub>2</sub>/100 gm/min. If this observation is confirmed it will yield further support for the high metabolic rate of the cephalad end of the neuraxis. The percentage decrease in cerebral metabolic rate produced by potential sodium remains the same: 36% in man and 56% in dog.

HAROLD E. HIMWICH, M. D.

<sup>1</sup> Himwich, W. A., Homburger, E., Maresca, R., Himwich, H. E. Brain metabolism in man: Un-anesthetized and in pentothal narcosis. *Am. J. Psychiat.* **103**: 689-696, 1947.

<sup>2</sup> Homburger, E., Himwich, W. A., Etsten, B., York, G., Maresca, R., Himwich, H. E. Effect of pentothal anesthesia on canine cerebral cortex. *Am. J. Physiol.* **147**: 343-345, 1946.

<sup>3</sup> Kety, S. S., Schmidt, C. F. The determination of cerebral blood flow in man by the use of nitrous oxide in low concentrations. *Am. J. Physiol.*, **143**: 53-66, 1945.

<sup>4</sup> Kety, S. S., Harmel, M. H., Shenkin, H. A., Schmidt, C. F. Nitrous oxide method for measurement of human cerebral blood flow. Experimental evaluation of fundamental assumptions. *Fed. Proc.* **6**: 142, 1947.

<sup>5</sup> Gibbs, F. A., Maxwell, H., Gibbs, E. L. Volume flow of blood through the human brain. *Arch. Neurol. and Psychiat.* **57**: 137-144, 1947.

## COMMENT

### THE NEW YORK MEETING

The several innovations in the program of the recent annual meeting are indicative of the wholesome changes which are taking place within the Association. This one hundred and third convention of the members was, to a considerable extent, the culmination of efforts which had their beginnings in 1945. In that year the Council appointed the Committee on Reorganization and authorized the establishment of The Psychiatric Foundation. During the New York meeting the members devoted themselves for a day and a half to the reorganization of the Association and for an entire afternoon to learning about The Foundation. Their energy and enthusiasm in evolving recommendations for the expansion of the Association's activities contributed considerably to the success of the meeting. The presence of 1666 members and 1996 nonmembers gave evidence of the growth of the Association and the increased interest in psychiatry.

Other innovations which were introduced during the meeting included the giving of first place on the program to the Presidential Address and a more dignified arrangement for the election of officers. Dr. Samuel W. Hamilton's address might well be described as a "Report on the State of the Union." With his gift for presenting things clearly and in their proper setting his address was in every respect a perfect prelude for the sessions which were to follow. The arrangements he made for the election of of-

ficers provided ample opportunity for every member to cast his ballot and they seemed like a wholesome departure from the previous customary procedure.

The addresses by Dr. Brock Chisholm, Secretary of the Interim Commission to The World Health Organization, and Dr. John R. Rees of London, England, served to make the international aspects of psychiatry more meaningful and stimulated interest in the International Mental Health Congress in 1948. Among the 694 members and guests who attended the banquet quite a number expressed their intention of going to London for this meeting next year. There were 822 members who made dinner reservations for the round table meetings, and the scientific presentations had seemingly larger audiences than in the previous years.

In addition to the scientific value of the meeting and the pleasure of visiting with colleagues a great deal was accomplished in behalf of an expanded program. There is good assurance now that the Association will assume a more active leadership in the field of psychiatry than at any previous time within its history. This cannot come about, however, without a considerable assistance from the membership. Those who attended the New York meeting have initiated a program which now needs to be implemented by the entire membership.

LEO H. BARTEMEIER, *Secretary.*

### JUVENILE DELINQUENCY IN GREAT BRITAIN

The British Information Services have recently issued a pamphlet giving figures on juvenile delinquency in Great Britain during World War II. In contrast to the first world war, during which delinquency rose steadily until peace came, the figures show a constant or a decreasing rate of juvenile delinquency after the first marked increase in 1940-41. This period coincided with the period of continuous air raids, with evacua-

tion movements, and with absence from home of older people. Thus, wartime conditions aggravated the peacetime causes of delinquency. These had been studied carefully by the London School of Economics, which compared a group of 1,000 delinquent boys with a control group of children of the same age and from the same schools who had never come before the courts. Significant differences between these groups were found

in the realms of parental controls, school attainments, and broken homes. The effect of the war upon these factors is obvious. Thirty percent of all juvenile offences in London during peacetime were committed during the hours of darkness; wartime blackout conditions naturally increased the intensity of darkness and offered more opportunity for "breaking and entering," which accounted for three-fourths of all the indictable offences with which children and young persons were charged in the Juvenile Courts. Because of evacuations and the destruction of schools, school attendance became irregular, and many children were brought before the courts who had not been in school since the war started. The abnormal home conditions that resulted from evacuation, destruction of homes in target areas, life in air-raid shelters, absence of parents in the services and in war work contributed to the rise in juvenile delinquency, as did the general wartime restlessness and strain. Facilities to handle juvenile delinquents were naturally overburdened during the war years.

The number of delinquents in proportion to the total number of young people under 17 was very small, ranging in various years and age groups from 0.8% to 1.6% for boys, and never exceeding 0.19% for girls. This may have been due to the concerted

efforts that were made on many fronts to prevent delinquency. Youth services providing both social life and recreative work were extended during the war, with government financial aid for expenditures on premises, equipment, and trained leadership. Pre-Service training organizations, reaching down to the 13-year-old age group (which is the group with the highest delinquency rate) have had phenomenal success. The school-leaving age was raised; welfare schemes for young industrial workers were instituted; the schools became social centers. New training schools for delinquents have been established, and these have been supplemented by foster home care. Parental responsibility for children's behavior is being stressed: many Juvenile Courts are now held in the evening so that working fathers may attend, and some local authorities are running classes for fathers in child care. Parents' associations are increasing. Better training in youth problems and psychology has been recommended for the Clerks of the Court, the legal advisors to the justices. The probation system has steadily improved, and use of it has greatly increased. There is a growing public interest in such matters as housing, community centers, and the prevention of unemployment; and local surveys of juvenile delinquency stress the necessity of tackling the basic causes of delinquency by means of basic social reforms.

## NEWS AND NOTES

**DR. HAMILTON TAKES OVER NEW JERSEY HOSPITAL.**—The President of The American Psychiatric Association for 1946-47 was recently appointed superintendent of the Essex County Hospital, Cedar Grove, New Jersey, and assumed his official duties July 1, 1947. This hospital is an institution accommodating about 2,500 patients and enjoys an outstanding reputation. Dr. Hamilton joins its staff after 11 years with the United States Public Health Service in Washington, during which he made surveys of mental hospitals and state services throughout the country.

Dr. Hamilton's predecessor at Cedar Grove was Dr. Guy Payne, who had served as superintendent of the hospital for 30 years and was responsible for the excellent standing it had attained.

**AMERICAN ASSOCIATION ON MENTAL DEFICIENCY.**—At the 71st annual meeting of the American Association on Mental Deficiency held in St. Paul May 27-31, the following officers were elected: President, Dr. Lloyd Yepson; President-Elect, Dr. Edward J. Humphreys; Secretary-Treasurer, Dr. Neil A. Dayton; Editor of Journal, Dr. Edward J. Humphreys.

Final plans were outlined for the First International Congress on Mental Deficiency, which will be held in Boston at the Hotel Statler, May 11-15, 1948. It is anticipated that there will be delegates and speakers from North and South America, the British Isles, Europe, Australia, and New Zealand. The chairman for the Committee on Arrangements is Dr. C. Stanley Raymond.

**INTERNATIONAL CONGRESS ON MENTAL HEALTH.**—In the summer of 1948 there will take place in London an International Congress on Mental Health. Conferences will cover the subjects of child psychiatry, medical psychotherapy, and mental hygiene. Dr. J. R. Rees is chairman of the organizing committee. Dates of the Congress are August 12 to 21, 1948. Requests for information about the Congress should be addressed to the Organiser, International

Congress on Mental Health, 39 Queen Anne Street, London, W. 1, England.

**SECTION ON PRIVATE PRACTICE OF PSYCHIATRY.**—All members of The American Psychiatric Association who wish to join the recently established Section on the Private Practice of Psychiatry and whose names do not already appear in the Biographical Directory of the APA published in 1941 are urged to send their names and principal biographical data to the secretary of the section, Dr. J. G. N. Cushing, 11 East Chase St., Baltimore 2, Md. The chairman of the section, Dr. Wendell Muncie, announces that they wish to compile a list of all the active workers in the private practice of psychiatry and would appreciate having information from these workers as to whether hospital facilities are available to them for their own treatment of their patients.

**MILITARY CITATION, CAPT. F. L. McDANIEL (MC), USN.**—For outstanding work done in construction, organization, and command of the San Leandro Naval Hospital, San Leandro, Calif., during the war, Capt. Frederick L. McDaniel of Alexandria, Virginia, has recently been awarded the Commendation Ribbon by the Secretary of the Navy, Honorable James Forrestal. The San Leandro Hospital was one of the institutions that received many patients for special treatment in connection with war psychoneurosis of combat origin.

**PHILADELPHIA PSYCHOANALYTIC SOCIETY.**—At its annual business meeting on June 14, 1947, the Philadelphia Psychoanalytic Society elected officers for the year as follows: President, Dr. LeRoy M. A. Maeder; Vice-President, Dr. George W. Smeltz; Secretary-Treasurer, Dr. Robert S. Bookhammer.

**NORTH PACIFIC SOCIETY OF NEUROLOGY AND PSYCHIATRY.**—The following officers were elected at the 1947 meeting of the North Pacific Society of Neurology and Psychia-

try: President, Dr. Frank Turnbull; President Elect, Dr. Herman A. Dickel; Secretary-Treasurer, Dr. Gerhard B. Haugen. Four members of the Executive Committee were elected: Dr. Ryle Lewis, Dr. Gordon Hutton, Dr. S. N. Behrens, and Dr. Ralph Stoltzheise. The constitution was revised to make American Board Certification or eligibility for such certification a prerequisite for Fellowship. The 1947 meeting will be held at Vancouver, B. C., the latter part of March.

**RESIDENCY TRAINING PROGRAM, NORTH LITTLE ROCK, ARKANSAS.**—The American Medical Association and the American Board of Psychiatry and Neurology have approved the Veterans Administration Hospital, North Little Rock, Arkansas, for 15 residents for a 3-year training period in psychiatry. In addition to officers of the VA Hospital, the teaching staff is drawn from the University of Arkansas School of Medicine and from Washington University School of Medicine, St. Louis. Residents will be accepted for training on July 1 and January 1 of each year, with an annual stipend of \$3,000 for physicians who served as medical officers during World War II and an annual stipend of \$900 to \$1,800, plus subsistence, for others. Those interested should write to Dr. H. W. Sterling, manager of the hospital.

**INTERNATIONAL CONFERENCE OF PHYSICIANS.**—The Royal College of Physicians is arranging an International Conference of Physicians to be held in London during the week of September 8th to 13th, 1947. The Conference will be divided into the following sections: cardiology, dermatology, disorders of the chest, general medicine, neurology, pediatrics, psychiatry, and social medicine. Admission to the conference is confined to medical practitioners and is by ticket only. Dr. G. B. Mitchell-Heggs, Royal College of Physicians, Pall Mall East, London, S. W. 1, is the organizing secretary.

**INTERNATIONAL CONFERENCE ON PSYCHOSURGERY.**—An international congress on psychosurgery will be held in Lisbon in April, 1948, at the invitation of the Portu-

guese Government and the University of Lisbon. Chairman of the United States Committee is Dr. Walter Freeman, 2014 R St., N. W., Washington 9, D. C.

**ELECTROSHOCK RESEARCH ASSOCIATION.**—At a meeting on May 20, 1947, the Electroshock Research Association elected the following new officers: President, Dr. Nathan K. Rickles; Vice President, Dr. Emerick Friedman; Secretary-Treasurer, Dr. Paul H. Wilcox; and Councillors, Dr. Ernest A. Spiegel and Dr. Esther Bogen Tietz.

**MEETING OF COURT PSYCHIATRISTS.**—In conjunction with the 1947 annual meeting of The American Psychiatric Association, Dr. Leo L. Orenstein, Psychiatrist-in-charge at the Psychiatric Clinic of the Court of General Sessions, New York, N. Y., arranged for a meeting of court psychiatrists from various parts of the country. The first of such meetings had been held in Chicago in 1946, when Dr. William H. Haines of the Behavior Clinic of the Criminal Court of Cook County was host to psychiatrists interested in forensic aspects of the specialty.

This year the meeting was held May 19, in New York City. Dr. Orenstein was host at a dinner which was followed by a discussion of two important problems in court psychiatry: one, the function of the psychiatrist in the court, and two, the problems of juvenile delinquency. Eighteen psychiatrists and one probation officer attended the meeting and several judges from the Criminal Courts in New York were invited. Four outstanding judges did attend and participate in the discussions. They indicated a need for expansion of psychiatric facilities in courts and emphasized the value of therapeutic possibilities. At present, very few Court Clinics in this country are equipped with adequate personnel and other facilities to carry on organized treatment.

Because of the success of this meeting and the previous one in Chicago, it is believed that, in the future, meetings each year at the time of the annual convention of the APA would be of great value in improving conditions in Court Clinics.

**NATIONAL ASSOCIATION FOR THE EMPLOYMENT OF THE HANDICAPPED.**—This voluntary association was recently organized and incorporated with its office at 1026 17th St., N. W., Washington, D. C. It is taking over the work that was done by the Retraining and Reemployment Administration, Department of Labor, in the last two years in promoting the employment of handicapped people. The scope has been broadened to include mentally as well as physically handicapped persons.

**DEPARTMENT OF REHABILITATION AND PHYSICAL MEDICINE.**—At the New York University College of Medicine, under the direction of Dr. Howard A. Rusk, a new Department of Rehabilitation and Physical Medicine has been set up. It will train medical students in the so-called third phase of medical care: preparing the patient to go from bed to the job. Patients in Bellevue and other municipal hospitals will be the first to benefit from the new department, under an arrangement with the Department of Hospitals.

**VOCATIONAL REHABILITATION.**—Under a grant from the Commonwealth Fund, plans have been worked out whereby the Division

of Rehabilitation of the National Committee for Mental Hygiene can carry on for at least a two-year period a project in the vocational rehabilitation of people whose mental or emotional problems have constituted a vocational handicap. The Division will work in close cooperation with the Federal Bureau of Vocational Rehabilitation and also with the State Bureaus of Vocational Rehabilitation in Connecticut, Michigan, and New York. The project will be carried on in different types of communities: a large city, smaller urban centers, and rural areas.

**NEED FOR CHILD GUIDANCE CLINICS.**—The recent annual report of the National Committee for Mental Hygiene calls attention to the following facts: There are 25 states in which not even one child guidance psychiatric clinic is in existence; in the entire country there are less than 400 clinics. In the year 1946, between 250,000 and 400,000 teen-agers passed through our juvenile courts, whereas only 50,000 boys and girls could get help from child guidance clinics. America really needs at least 1,400 full-time community clinics, but, although many communities have the funds to open such clinics, the lack of trained personnel is a serious deterrent.

#### THE AMERICAN BOARD OF PSYCHIATRY AND NEUROLOGY, INC.

The following were certified at Philadelphia, Pennsylvania, May 15-16-17, 1947.

##### PSYCHIATRY

(By Examination)

Adelman, Solomon, Veterans Hospital, Northport, N. Y.  
 Argent, Albert H., Veterans Administration, Marion, Ind.  
 Bagenstose, Clinton Harry, Payne-Whitney Clinic, OPD, 525 East 68th St., New York, N. Y.  
 Baker, James Louis, U. S. Public Health Service Hospital, Fort Worth, Tex.  
 Baumann, Milton Charles, Veterans Hospital, Minneapolis, Minn.  
 Beamer-Maxwell, Eleanor, Eastern State Hospital, Williamsburg, Va.  
 Beckman, William Peter, South Carolina State Hospital, Columbia, S. C.  
 Belisle, John A., Wayne County General Hospital Eloise, Mich.  
 Bell, H. Craig, Abington Memorial Hospital, Abington, Pa.  
 Bennett, Raymond J., 7256 Medical Arts Bldg., Tacoma, Wash.  
 Bernstein, Nathan K., Room 518, Gas & Electric Bldg., Utica 2, N. Y.  
 Berthelsdorf, Siegfried R., Manhattan State Hospital, New York, N. Y.  
 Bird, Brian, 111 St. George St., Toronto 5, Canada.  
 Bond, Douglas D., 2065 Adelbert Rd., Cleveland, Ohio.  
 Boshes, Louis D., 912 South Wood St., Chicago, Ill.  
 Buscaglia, Chris J., State Hospital, Ypsilanti, Mich.  
 Bush, Stuart K., Colorado Psychopathic Hospital, Denver, Colo.

Cameron, Dale Corbin, U. S. Public Health Service Headquarters, Washington, D. C.  
 Cammarata, Joseph Anthony, State Hospital, Dixmont, Pa.  
 Campbell, Howard R., 1112 Third National Bldg., 32 N. Main St., Dayton, Ohio.  
 Carlisi, Dominick J., Pilgrim State Hospital, West Brentwood, N. Y.  
 Chandler, Arthur L., Veterans Administration N. P. Hospital, Los Angeles, Calif.  
 Coburn, Frank E., Psychopathic Hospital, Iowa City, Iowa.  
 Cogan, Samuel, Station Hospital, Ft. Hamilton, Brooklyn, N. Y.  
 Cohen, Max, Veterans Hospital, Coatesville, Pa.  
 Colley, Arthur T., Veterans Administration, Lyons, N. J.  
 Crandell, C. Archie, New Jersey State Hospital, Greystone Park, N. J.  
 Cruvant, Bernard A., St. Elizabeths Hospital, Washington 20, D. C.  
 Davis, C. Nelson, 133 South 36th St., Philadelphia, Pa.  
 deAgular, Alcinda P., Veterans Administration Hospital, Bedford, Mass.  
 Dean, Stanley R., 322 Main St., Stamford, Conn.  
 Dinenberg, Samuel, 4744 "C" St., Philadelphia 20, Pa.  
 Douglass, William C., Veterans Administration Hospital, Palo Alto, Calif.  
 Drubin, Lester, Veterans Administration Hospital, Northport, N. Y.  
 Dyer, R. Stuart, 654 West Onondaga St., Syracuse, N. Y.  
 Epstein, Carl M., 1010 West 12th St., Topeka, Kans.  
 Fish, David J., Box No. 5, Howard, R. I.  
 Fleischl, Maria F., 140 West 86th St., New York 24, N. Y.  
 Flumerfelt, John M., University Hospitals, Cleveland 6, Ohio.

Foster,  
 Kans.  
 Frank  
 Free, K  
 Clin  
 Freund  
 Garber  
 N. J.  
 Ginsbu  
 N.  
 Glas  
 Grotfel  
 Wyo  
 Goodst  
 Goolke  
 Greaso  
 Greibe  
 Ind.  
 Grosst  
 Hattor  
 Kan  
 Head,  
 N.  
 Heisle  
 Ill.  
 Herm  
 Mic  
 Herse  
 Con  
 Hewit  
 Ft.  
 Hink  
 Elo  
 Hirsch  
 Hirsch  
 Hock  
 Hubb  
 Dal  
 Hum  
 Cal  
 Hurl  
 Wi  
 Jacks  
 Jacob  
 Johns  
 Mi  
 Iord  
 Kald  
 Ma  
 Kapl  
 ha  
 Kess  
 Kimb  
 M  
 King  
 Knap  
 Koff  
 Kore  
 M  
 Kort  
 Lang  
 Led  
 Leve  
 pi  
 Levi  
 Lin  
 Lipe  
 Lipt  
 Mae  
 P  
 Mal  
 P  
 Mar  
 Mar  
 Mar  
 M  
 Mar  
 vi  
 \*M  
 V  
 Ma  
 K  
 Me  
 I  
 Me  
 M  
 Mi  
 Mo  
 Na  
 Ni  
 Ni  
 Pa  
 Ph  
 Po

Foster, David Bernard, Menninger Foundation, Topeka, Kans.  
 Frankenthal, Kate, 38 West 69th St., New York, N. Y.  
 Freg, Richard M., Veterans Administration Mental Hygiene Clinic, 225-27 South 4th St., Philadelphia, Pa.  
 Freund, Henry, 1600 South Ave., Rochester 7, N. Y.  
 Garber, Robert S., New Jersey State Hospital, Trenton, N. J.  
 Ginsburg, Sol Wiener, 12 East 97th St., New York 29, N. Y.  
 Glass, Sarah E., 27 Elm St., Worcester, Mass.  
 Glatfely, James S., Fort McKenzie Hospital, Sheridan, Wyo.  
 Goodstone, Gerald L., 708 Irving Ave., Syracuse, N. Y.  
 Goolker, P., 100 East 94th St., New York 28, N. Y.  
 Greason, Thomas L., 1704 Broad St., Providence, R. I.  
 Greiber, Marvin F., 420 West Washington St., Muncie, Ind.  
 Grossman, Maurice, Veterans Administration, Augusta, Ga.  
 Hatten, Lloyd William, 406 United Life Building, Salina, Kans.  
 Head, John James, 121 Westchester Ave., White Plains, N. Y.  
 Heisler, Friedy B., 77 West Washington St., Chicago 2, Ill.  
 Herman, Louis, Veterans Administration, Fort Custer, Mich.  
 Hersey, Thomas F., 291 Whitney Ave., New Haven 11, Conn.  
 Hewitt, Robert T., U. S. Public Health Service Hospital, Ft. Worth, Tex.  
 Hinko, Edward N., Wayne County General Hospital, Eloise, Mich.  
 Hirschberg, Cotter, 4200 East 7th Ave., Denver, Colo.  
 Hirschfeld, Gerhard, State Hospital, Norwich, Conn.  
 Hoekstra, Clarence S., 4200 East 9th Ave., Denver, Colo.  
 Hubbard, Oscar E., Room 1507, 1114 Commerce St., Dallas, Tex.  
 Hume, Portia B., Langley Porter Clinic, San Francisco, Calif.  
 Hurley, James B., 324 East Wisconsin Ave., Milwaukee, Wis.  
 Jackson, George W., State Hospital, Little Rock, Ark.  
 Jacobs, Louis, 4316 28th Pl., Mount Rainier, Md.  
 Johnson, Franklin, Wayne County General Hospital, Eloise, Mich.  
 Jordani, Leopold, 97 Central Park West, New York, N. Y.  
 Kaldeck, Rudolph, c/o Boston State Hospital, Boston, Mass.  
 Kaplan, Julius Arthur, Veterans Administration, Northampton, Mass.  
 Kesselman, Samuel R., 681 Clarkson Ave., Brooklyn, N. Y.  
 Kimbell, Isham, Jr., Veterans Administration, Fort Custer, Mich.  
 King, Harold N., 34 Hampton Roads Ave., Hampton, Va.  
 Knapp, Joseph L., Weston State Hospital, Weston, W. Va.  
 Koff, Salmon A., Veterans Administration, Mendota, Wis.  
 Koren, Louis, Wayne County General Hospital, Eloise, Mich.  
 Korman, Samuel H., 681 Clarkson Ave., Brooklyn, N. Y.  
 Langton, Elinor M., 4401 Market St., Philadelphia 4, Pa.  
 Ledien, Ulrich, 106 North Glen Oak St., Peoria, Ill.  
 Leventhal, George, Veterans Administration N. P. Hospital, Los Angeles 25, Calif.  
 Levin, Samuel, State Hospital, Philadelphia 14, Pa.  
 Lindley, Stanley B., State Hospital, Willmar, Minn.  
 Lipson, Sam J., 6755 South Kolmar Ave., Chicago 20, Ill.  
 Lipton, Samuel D., Billings Hospital, Chicago 37, Ill.  
 Maeder, LeRoy M. A., 206 South 13th St., Philadelphia, Pa.  
 Mahoney, Vincent P., Pennsylvania General Hospital, Philadelphia, Pa.  
 Manno, Joseph A., State Hospital, Central Islip, N. Y.  
 March, Thomas A., Station B., Poughkeepsie, N. Y.  
 Marder, Samuel H., 419 Commonwealth Ave., Boston, Mass.  
 Marshall, Joseph H., Springfield State Hospital, Sykesville, Md.  
 \*Masland, Richard L., Bowman Gray School of Medicine, Winston-Salem, N. C.  
 Mayer, Frederick, 233 East Madison Street, Louisville, Ky.  
 McCormick, Jay Earl, 30 North Michigan Ave., Chicago, Ill.  
 McDermaid, Gladys, King County Hospital, Brooklyn, N. Y.  
 McLaughlin, Francis, 4 East Read St., Baltimore 2, Md.  
 Miller, Carl, State Hospital, Kankakee, Ill.  
 Moscovitz, Harry, 1111 Park Ave., New York, N. Y.  
 Nadell, Raymond, 910 Park Pl., Brooklyn, N. Y.  
 Nickel, Kenneth C., State Hospital, Ypsilanti, Mich.  
 Nickels, Mervyn M., State Hospital, Traverse City, Mich.  
 Parks, Richard H., State Hospital, Warren, Pa.  
 Phillips, Roy A., Edward Hines, Jr., Hospital, Hines, Ill.  
 Porter, Edgar Lee, 103 Walnut Ave., Wayne, Pa.

\* Denotes complementary certification.

Powdermaker, Florence N., P. Division, Veterans Administration, Washington, D. C.  
 Rader, George S., 447 South Henderson St., Bloomington, Ind.  
 \*Ranson, Stephen W., Johns Hopkins Medical School, 615 North Wolfe St., Baltimore, Md.  
 Reznick, Samuel, Veterans Administration N. P. Hospital, Los Angeles, Calif.  
 Robins, Sol A., The Long Island Home, Amityville, N. Y.  
 Rodofsky, Milton H., 591 Morton St., Boston, Mass.  
 Roecker, Roland D., Northfield Rd., Millington, N. J.  
 Rosanoff, William R., 248 East Main St., Alhambra, Calif.  
 Rosenthal, Norris M., 3831 North Keystone Ave., Chicago 41, Ill.  
 Rosman, Daniel M., Winter Veterans Administration Hospital, Topeka, Kans.  
 Rubin, Emanuel, Veterans Hospital, Canandaigua, N. Y.  
 Ruddell, Thomas A., 1353 Chew St., Allentown, Pa.  
 Rudnick, Julius, Kings County Hospital, Mental Hygiene Clinic, Brooklyn, N. Y.  
 Safier, Benno, Agnews State Hospital, Agnew, Calif.  
 Saslow, George, Washington University School of Medicine, 640 South Kingshighway, St. Louis, Mo.  
 Scanlon, James P., 15 East Langhorne Ave., Llanerch, Pa.  
 Schauer, Gerhard, 80-54 Little Nick Parkway, Floral Park, N. Y.  
 Schegloff, Ber M., 111 Queensberry St., Boston, Mass.  
 Schub, Rosa B., State Hospital, Trenton, N. J.  
 Schutkeker, Bruno G., 400 Forest Ave., Buffalo, N. Y.  
 Silver, Emmanuel, 753 Oregon Ave., Palo Alto, Calif.  
 Sirkin, Jacob, 107 East Miller St., Newark, N. Y.  
 Smith, Charles A., 1617 Classen, Oklahoma City, Okla.  
 Smith, Stewart R., 15 Brae Rd., Quincy, Mass.  
 Stell, Bernard S., 315 Woodbridge Ave., Buffalo 14, N. Y.  
 Stern, Marvin, 260 Feinmore St., Brooklyn 25, N. Y.  
 Stratton, H. Gordon, 1007 Lakeshore Rd., New Toronto, Ontario, Canada.  
 Suratt, Theodore P., 10006 Carnegie Ave., Cleveland 6, Ohio.  
 Swanson, Florence L., 1116 Spring St., Seattle 4, Wash.  
 Talbot, David R., Veterans Administration N. P. Hospital, Los Angeles, Calif.  
 Thale, Thomas, 1420 Grattan St., St. Louis 4, Mo.  
 Tidd, Charles W., 405 North Bedford Dr., Beverly Hills, Calif.  
 Todd, Oswald V., St. Elizabeths Hospital, Washington 20 D. C.  
 Traub, Leo Milton, Veterans Hospital, Palo Alto, Calif.  
 Unger, Max, Box 1453, Middletown, N. Y.  
 Van Amberg, Robert J., 85 South Harrison St., East Orange, N. J.  
 Waldman, Abraham L., Sate Hospital, Norristown, Pa.  
 Walters, Guy M., State Hospital, Willard, N. Y.  
 Wassell, Benjamin, Greystone Park, New Jersey.  
 Witte, Max E., 29 Deering St., Portland, Me.  
 Wolfe, Ralph I., 1711 Bathurst St., Toronto, Ontario, Canada.  
 Wood, Horatio C., The Mitchell Sanitarium, 106 North Glen Oak Ave., Peoria, Ill.  
 Worthington, Richard V., Cushing Veterans Administration Hospital, Framingham, Mass.  
 Wright, Donovan G., U. S. Naval Hospital, Great Lakes, Ill.  
 Wright, Harold S., 525 East 68th St., New York, N. Y.  
 Zaphiropoulos, Miltiades L., 30 East 60th St., New York 22, N. Y.  
 Zbranek, Ladislaus J., U. S. Public Health Service Hospital, Fort Worth, Tex.

## PSYCHIATRY

(On Record)

Black, Neil D., Marcy State Hospital, Marcy, N. Y.  
 Cook, Frederick M., Veterans Administration, Lexington, Ky.  
 Crawford, Clarence M., Kingston Penitentiary, Kingston, Ontario, Canada.  
 Charlton, George E., State Hospital, Norfolk, Neb.  
 Elkins, Harry, State Hospital, Augusta, Me.  
 Fuller, Earl W., State Hospital, Greystone Park, N. J.  
 Funderberg, Jo, State Hospital, Torrance, Pa.  
 Hare, John Herbert, State Hospital, Evansville, Ind.  
 Klein, Sidney, 146 West 79th St., New York 24, N. Y.  
 Levin, Hyman, 400 Forest Ave., Buffalo 13, N. Y.  
 McNeil, John Francis, Matteawan State Hospital, Beacon, N. Y.  
 Millet, John A. P., 11 East 68th St., New York 21, N. Y.  
 Moulton, Bryant Edward, 18 Symmes Road, Winchester, Mass.  
 Pinney, Ione, State Hospital, Stockton, Calif.  
 Sands, James P., Millville, Pa.  
 Sporn, Abram J., State Hospital, Middleton, N. Y.  
 Stouffer, John F., Philadelphia General Hospital, Philadelphia 4, Pa.

Verdel, Louis F., Veterans Administration Hospital, Northport, N. Y.  
 Whitney, Ray L., McLean Hospital, Waverley 79, Mass.  
 Wilson, George W., 30 North Michigan Ave., Chicago, Ill.

## NEUROLOGY

(By Examination)

Abbott, Kenneth Harvey, 813 Griswold St., Worthington, Ohio.  
 Bailey, Pearce, 3232 Reservoir Rd., Washington 7, D. C.  
 Barnard, Ruth I., 3617 West 6th St., Topeka, Kans.  
 \*Cohen, Samuel, Medical Arts Bldg., Philadelphia 2, Pa.  
 Greene, Justin L., 700 West 168th St., New York, N. Y.  
 \*Kagwa, Benjamin H., 6306 Cottage Grove Ave., Chicago, Ill.  
 \*Lerman, Jacob, 633 St. Marks Ave., Brooklyn 16, N. Y.  
 \*Meller, Robert L., 1514 Medical Arts Bldg., Minneapolis, Minn.  
 Murphy, J. Peter, 2014 R St., N. W., Washington, D. C.  
 Newbill, Hugh Page, DeJarnette State Sanatorium, Staunton, Va.  
 \*Rackow, Leon L., 8 Capstone Apartments, Tuscaloosa, Ala.  
 Roemer, Edward P., 1 West Main St., Madison, Wis.  
 Sheps, Jack George, Mt. Sinai Hospital, New York 29, N. Y.  
 \*Sitter, Stephen C., Room 2C475, Pentagon Bldg., Office of Surgeon General, Washington, D. C.  
 Tigay, Eli L., 5200 West Chicago Ave., Chicago 51, Ill.

\*Denotes complementary certification.

## NEUROLOGY

(On Record)

Kubick, Charles S., Massachusetts General Hospital, Boston, Mass.  
 Meyers, Milton K., 1536 South Broad St., Philadelphia 46, Pa.  
 Olmick, Ignatius N. W., 435 East 57th St., New York, N. Y.

## NEUROLOGY AND PSYCHIATRY

(By Examination)

Carlson, Helen Blake, 25 East Washington St., Chicago, Ill.  
 Denbo, Elic A., 596 Benson St., Camden, N. J.  
 Gendel, Edward, 404 East 55th St., New York 22, N. Y.  
 Glass, Albert J., (Major) Brooke General Hospital, Ft. Sam Houston, Tex.  
 Goodman, Bernard, 9132 Harding Ave., Surfside, Miami Beach, Fla.  
 Ingham, Harrington V., 4084 Leeward Ave., Los Angeles 5, Calif.  
 Kaufman, Samuel S., 285 Central Park West, New York 24, N. Y.  
 Rauh, Albert E., Veterans Administration, Lyons, N. J.  
 Teitelbaum, Harry A., Veterans Administration Hospital, Topeka, Kans.

## NEUROLOGY AND PSYCHIATRY

(On Record)

Price, George E., 1218 Terry Ave., Seattle 1, Wash.

## BOOK REVIEWS

THE PSYCHOLOGY OF WOMEN, Volume 1, By *Helena Deutsch, M. D.* (New York: Grune & Stratton, 1944.)

The need for this book and the general appreciation of its value is indicated by the fact that it had gone into its fifth printing at the time of the appearance of its companion volume. It is the first book in which all the pertinent information about the normal psychic life of women and their normal conflicts have been brought together. For this reason alone it constitutes a great practical contribution to psychiatric literature. This volume comprises the final conclusions of 30 years of clinical investigation into the problems of feminine psychology by the foremost worker in this particular field.

The material of this book is not restricted to the personal observations of the author. It is enriched by data taken from reliable cases and life histories recorded by other physicians, routine hospital records, the files of various social agencies, and contributions from creative literature. The author does not analyse the determining importance of the social milieu and the biological factors in relation to the psychological manifestations, but throughout the book she emphasizes the individual emotional experiences and conflicts connected with them. This predominantly clinical point of view has particular value for illustrating the development of the feminine psyche.

Dr. Deutsch deals with three principal themes which are intimately related to each other. The first of these is the exposition of the psychological life of woman starting with the young girl's development into womanhood. The second is the analysis of the foundations of the feminine personality, and the third is a discussion of the nonfeminine aspects of femininity. The last 3 chapters deal with this problem.

Dr. Deutsch divides the psychological development of the girl into prepuberty, early puberty, puberty, and adolescence. She describes and discusses in a wealth of detail the changes which are characteristic for each of these periods of development. In this way, the reader is presented with the various factors which contribute to the gradual evolution and establishment of the 3 essential traits of femininity. They are narcissism, passivity, and masochism, and the author devotes a special chapter to each of these fundamental traits. The author has wisely chosen to deal with the subject of motherhood, which she regards as the central problem of femininity, in a companion volume.

In the opinion of this reviewer, both of these volumes are rapidly establishing themselves as standard text books for all who are seriously interested in obtaining adequate understanding of feminine psychology.

LEO H. BARTEMEIER, M. D.,  
Detroit.

CLINICAL PSYCHOLOGY. By *C. M. Louttit.* (New York: Harper and Brothers, 1947.)

This is the revised edition of a widely used elementary textbook designed for the instruction of students of clinical psychology. For the most part it deals with the adjustment problems of children and is not concerned with deviant behavior in adults. The author's broad conception of the scope of clinical psychology is indicated by his statement that it "is not, and cannot be, limited only to psychology as its basic science. Rather the work of the clinical psychologist is intimately bound up with at least four major fields, viz., psychology, medicine, education and sociology."

In accordance with this broad conception, a great variety of topics are surveyed including not only emotional disturbances and school difficulties but also the behavioral consequences of neurological disability, sensory defect, chronic disease, etc., with brief descriptions of the underlying fundamental condition. Because of this wide coverage, the treatment of most topics is necessarily somewhat sketchy. However, there are few inaccuracies and the salient features of each condition are well described. Within this framework of brief considerations, the occurrence in the body of the text of numerous references to and citations of the literature ("Smith says," "Jones found," "Brown demonstrated," etc.), while undoubtedly useful to some readers, makes for a rather tedious style.

The author's ideas about treatment tend to emphasize "direct" methods such as environmental manipulation and habit training, and only passing attention is paid to analytically oriented expressive treatment. The suggested treatment of enuresis, in which restriction of liquids in the latter part of the day, awakening at specified times of the night, and the use of "star" charts play the major rôle, may be cited as an illustration.

The features of the work that will probably be of greatest interest and value to psychiatrists are the excellent chapters on psychometric methods and specific educational disabilities. The volume will continue to serve a very useful purpose as a source of elementary factual information concerning clinical problems. It will be somewhat less useful, the reviewer feels, as a description of modern conceptions of treatment.

ARTHUR L. BENTON, PH. D.,  
Louisville Mental Hygiene Clinic,  
Louisville, Ky.

THE WISCONSIN PRISONER, By *John Lewis Gillin.* (Madison: University of Wisconsin Press, 1946.)

This book reports a research carried out by the professor emeritus of sociology in the University of Wisconsin upon 486 prisoners in the Wisconsin State Prison at Waupun. The types of prisoners

especially studied were the murderers, the sex offenders, and the property offenders. As controls, the noncriminal brothers of the criminals were used.

In regard to the murderers, the following conclusions were drawn from the study. The potential murderer is one whose fundamental wishes have been frustrated at some period in his life. More than 30% of the murderers were drunk at the time of the crime or at least had been drinking. Almost 26% either were insane when they committed the murder or became insane after incarceration. About 6% were psychopathic. A larger proportion of the murders than of the sex offenders and property offenders came from a farm environment. Of the murderers, 47.1% were born of foreign parentage, as compared with 29.2% of the property offenders and 27.7% of the Wisconsin population. The lifers included a larger proportion of mental cases than did the other two classes, most of them being afflicted with dementia praecox and paranoid tendencies. Most murders are crimes of passion—explosive reactions to a difficult situation.

Sex offenders studied fell into 3 groups: homosexuals, cases of incest, and cases of rape. Conclusions drawn in regard to the first group are that "overt homosexuality is attributable to physical and mental traits which repelled women, to seduction early in life, or to economic circumstances which precluded heterosexual relations, either lawful or illicit. Most of them had either lost status altogether or had failed to attain it in a law-abiding group. Almost all had demoralized associates, and many had deadened by excessive drinking whatever inhibitions they may once have had. All of them, whether of low or high intelligence, have a history of emotional frustration, some of social example and incitement to perversion."

To one brought up in the tradition of British law, it is surprising to learn that sexual relations with a stepdaughter is considered incest in Wisconsin. This study reveals that 51% of those guilty of incest were mentally defective. The other significant factor in cases of incest was lack of emotional control. Sexual assaults on children were found to be committed usually by mentally unsound degenerates of the lowest order.

Under the heading of property offenders, there were included cases of arson, larceny, breaking and entering, burglary, forgery, armed robbery, and embezzlement. More than 73% of the arsonists were mentally defective, and more than 48% were farmers. The motives of the arsonists were desire for revenge, hope of collecting insurance, and pyromania. The author remarks that the number of forgers who commit the same crime again and again is striking. The bank robbers, embezzlers, and forgers constituted the intellectual aristocrats of the prison population. The average intelligence of the embezzlers was higher than that of any group in the prison. The author makes the comment that "in every community there are some business men who violate the strict standard of the statutes—Sutherland's so-called white-collar criminals."

In his final chapter the author summarizes his data in the following formulation:

(1) Conditions that seem to create a hazard:

low income of the parents, inferior intelligence, insanity, drunkenness, and disharmony in the home.

(2) Conditions hazardous unless offset by other influences: early termination of school, frustrations, feeling of inferiority, loss of self-esteem, and antisocial companions.

(3) Commonest precipitating factors of crime: threats to economic security, to emotional security, and suggestion from unscrupulous associates.

This is an extremely valuable and interesting contribution to the study of crime and well repays a careful reading. Throughout the book the author pays lip-service to Freudian nomenclature by making an altogether unnecessary use of such terms as mother fixation and Oedipus complex to denote the quite ordinary and usual affection of a son for his mother. However, the author quotes Havelock Ellis as contending that only by the very greatest accommodation of language can this emotional attraction to the mother be said to be of a sexual nature.

C. M. CRAWFORD, M. D.,  
Psychiatrist, Kingston Penitentiary,  
Kingston, Ontario.

#### NURSE-PATIENT RELATIONSHIPS IN PSYCHIATRY.

By *Helena Willis Render, R. N.* (New York: McGraw-Hill Book Company, Inc., 1947.)

"Nurse-patient Relationships in Psychiatry" answers a great need, long felt in the field of psychiatric nursing, for a text which would stress the importance of this aspect of the work. The principles underlying, and essential to, a knowledge of the subject are discussed fully in a straightforward and practical manner.

The book does not deal with clinical psychiatry nor nursing skills in the main but considers these subjects as they touch the primary nursing procedure, the management of the patient in action. The approach to the patient as a sick individual is covered completely in carefully developed discussion which will appeal to the student and gives to the instructor an excellent teaching outline. Diagnosis is not considered essential to good psychiatric nursing, and this comes as a boon to the teacher who must strive constantly to keep her classes free of technical discussions and devoted to the nursing care of the sick individual.

A full chapter is given over to a discussion of art, music, and literature in the life of the nurse and the patient. This is a new departure in the texts of psychiatric nursing and one which will have a valuable place. The usual glossary of terms is included but is developed to follow the "Outline of Observation of Behaviour" given earlier in the book.

This book is a very successful attempt to place before the student a practical aide to the improvement of nursing care and to the understanding of human relations. It has breadth and vision and should not grow old as techniques change but will remain basic. It will be a valuable addition to the library of every school of nursing.

ELIZABETH BRIGG, Reg. N.,  
Toronto Psychiatric Hospital.